THE MARINE REVIEW

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Are We Drifting Without a Policy?

Developments of Past Few Months Disclose Need of a Clear Shipping Program, Widely Understood and Actively Pushed

UNITY of desire may occasionally defeat its own objective. In such cases the absence of an active opposition fails to stimulate a struggle for accomplishment with the result that the objective is obtained only after long delay or is lost entirely.

Conditions in the merchant marine industry, including shipbuilding, shipping and foreign trade, reveal the presence of such a danger which, if unchecked, may lead to a negative or even disastrous result. Little or no argument can be provoked in any circle with regard to the advantage to the United States of possessing its own means of carrying its commerce. The feeling that such freedom from the whims of foreign shipowners is at least a national advantage if not a national necessity, is so universal that the mere statement carries its own proof. The absence of any opposing viewpoint is quite likely to dull the national effort to secure such freedom of ocean commerce.

Fitting Old Ship With a New Rudder

In plain words, this question of a merchant marine needs the individual attention and consideration of every American. A national policy on shipping affairs has not been worked out in this country for a half century or more, although during the same period internal expansion was developed to a degree which brought the United States to the rank of industrial leader of the world. The explanation for our failure to attain equally satisfying results with our shipping is familiar—our energies were concentrated on developing our own resources to supply the rapidly broadening demands of a growing nation.

A more favorable time for constructive study of this national problem has never been offered the present generation. The typical farmer from Kansas, who was ignorant of the part played by ocean transportation in his individual fortunes, has learned differently. Congestion at American ports with its consequent slowing down of industries far in the interior, the temporary food embargo in the early days of the war, the national educational campaign carried on to develop our shipbuilding resources as a necessary measure for winning the war, have all resulted in stimulating an interest in maritime affairs. It would be a colossal blunder to permit this newborn interest to disappear without any constructive effort to turn it to good use.

A study of the progress made since the signing of the armistice is far from encouraging. Operators of American ships are disturbed by the policy followed by the shipping board in allocating vessels, returning requisitioned ships and in revising the ocean rate fabric. The board's actions have been censured both as indicating a mistake in policy and as revealing a lack of policy. Shipbuilders suffer from the uncertainty caused by plans for revising the federal ship construction program, and the tardiness in permitting acceptance of orders for new ships from foreign owners. Exporters have witnessed a decline in trade or its loss to British competitors.

A Costly Lesson Quickly Forgotten

Events of recent months reveal that peace caught the nation napping. Apparently we have failed to prepare for peace in the same manner that we failed to prepare for war. England was surprised by war but was ready for peace. Advices from England show clearly the strong belief held there that America is ignorant of how to build up and operate a merchant marine and that England's position as commercial mistress of the seas is not seriously threatened.

Correction of present conditions of uncertainty depend entirely upon the development of constructive policies. Legislators are either indifferent or are ignorant of what is necessary. The national interest in shipping should not be allowed to die from malnutrition. Today's need is for the presentation to congress and to the public by those best informed on the subject, of clearly defined policies, quickly but thoroughly worked out and vigorously supported.

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World Charter Market Reviewed by

EXPORTS LIGHT

Unsettled Rate Conditions Discourage Shipping—Government Orders Rapidly Clearing Away

SHIPPING men are the "bears" in the ocean transportation field today. A further and material reduction in rates is what they want and apparently they will continue their efforts until something is done. The export and import agents insist that the tonnage supply is now adequate for all needs, especially for the export needs, and that the continued high ocean rates are detrimental to the speedy restoration of America's foreign commerce.

Recent cuts in ocean rates promulgated by the shipping board are said to have been for the purpose of meeting the rate reductions on British ships. If this portends an international rate war the merchant marine situation is in a bad shape. There is hope, however, that such is not the case. The peace conference at Paris has decided to appoint a committee on merchant marine which may work out a solution which will protect all flags. Incidentally, it might be well to recognize the fact that war conditions are rapidly disappearing. The chartering committee of the shipping board has resigned and already it is heard that charters taken on neutral ships during the war, at high rates, are proving unprofitable to both England and the United States. A further and probably radical change in the shipping situation may be expected before long. The return of President Wilson and Chairman Hurley should bring to a head the problem of settling upon a more definite shipbuilding and ship-operating policy. The maritime world is waiting for some definite statement of policy by the government.

Rates Must Pay the Costs

Ocean freight rates must be sufficient to pay for the cost of operation, the insurance and interest on the investment in the ships. The shipping board granted an increase in wage to officers on American merchantmen on the first day of the year. Today the cost of operating an American ship is excessive. It is much more than the cost of operation prior to the war. On this account, if for no other reason, the ocean freight rates cannot go as low as the prewar rates. But today money is obtaining a higher interest rate and the facilities of marine insurance companies are being taxed to the limit. And, finally, it is well known that the investment in ships today is much larger, ton for ton, than prior to the war.

While it is possible that further freight reductions will come about, it is unlikely any radical decrease in the cost of ocean transportation will be witnessed. There is ample reason for complaint against fluctuations in rates and it is anticipated that such a condition will soon be cleared up. The shipping board gave no prior announcement of its plans to reduce rates. The shippers insist that they should be informed in advance of such reductions that they may book their business accordingly. If such a plan can be worked out which will remove the cause of this complaint, it seems assured the shipping people would be better satisfied.

The reduced rates on English merchantmen have been in effect some time. During the past month the French made reductions, following the new schedule of rates announced by the shipping board. On general cargo steamships and French passenger vessels from United States Atlantic ports to French Atlantic ports, the rates were reduced from $60 to $41 per ton weight or measurement. The shipping board had been holding to $60 plus 10 per cent primage. The general cargo rate on French requisitioned and French or allied chartered steamers is $27, as compared with the $60 rate heretofore maintained.

American Rates Are Cut

The shipping board has sought to meet these reductions in rates by offering Emergency Fleet corporation vessels for private operation to carry freight at fixed rates. For instance, it proposed to take rosin from Atlantic ports to Antwerp for $2.80 per 100 pounds, turpentine for $3, phosphate rock to Antwerp for $40 per ton, barley from Pacific coast ports to England for $52.50 a short ton, cocoanut oil in bulk from north Atlantic ports to Rotterdam for $50 a long ton. Various rates were quoted for other voyages, but such quotations have not brought the rate quotations on American ships generally toward uniformity. It was not long after the French reductions had been made and the reduced schedule announced on shipping board vessels that the British came forward with another reduction of 66 2/3 per cent between the United States and England. The old rate of $3.50 per 100 pounds was thus reduced to $1, and by measurement from $1.75 per cubic foot to 50 cents. In the British schedule, cotton is given a special rating. The British

Will Return Ships

THE 87 Dutch ships with their 980,000 tonnage taken over under President Wilson's proclamation March 20, 1918, are to be returned at once unconditionally. The war emergency has ceased and more ships are being finished to bring troops home and move supplies, so that there is no longer justification for holding the Dutch ships. Furthermore they are sorely needed for cargoes of food and goods in Europe. On Feb. 2, the war trade board, after conference with the shipping board, announced the proposed action and explained that the transfer would be made just as fast as ships finished their present voyages to American ports.

Of the 87 Dutch ships seized several were destroyed by enemy action or storms while in the service of the United States. Under the agreement reached with the Dutch shipowners vessels destroyed were to be replaced either by money or by ships at option of the Dutch owners, and liberal rates for the use of the vessels were allowed.

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rate reduction came without warning, but the interesting part was that the shipping board at Washington met it on the same day with equal reductions in rates.

These reductions in rates are not misjudged in the steamship world. While it may look as though the United States is at last beginning to engage in a gigantic rate cutting fight with England, such a thing is not as yet established.

The reduction made in rates on shipping board vessels may have been made without taking due account of the investment in those ships. Chairman Hurley has announced from France that the government would write off about one-third of the building cost in order to make it possible to operate these ships on rates more nearly equal to the low rates which might be quoted by American privately owned ships built at lower costs.

May Use German Tonnage

In France, some arrangement is being worked out for the employment of German tonnage which has been tied up in German ports during the war. It has been proposed that the United States take about 450,000 tons of the German passenger boats and use them to bring troops home. England would acquire a like amount of tonnage for the same purpose. This would undoubtedly work some relief to private owners. If a standing army is to be maintained in Europe by all the allies for one year, and this German tonnage is to be released by the peace conference, the requirements for transports by our navy would undoubtedly dwindle considerably by spring. The work of transporting troops and carrying supplies to the standing army in Europe would be so reduced as to make it possible to return to the private American lines most of their larger ships which have been commandeered by the government during the war. When this is being worked out some slight reduction, generally, in freight rates may be expected. But that reduction will not be so great if the export trade of the United States develops in the meantime.

Revise Brokerage Fee

WHILE the shipbrokers have not succeeded in getting all they desire from the shipping board, they have at least been successful in persuading the board to increase the shipbroker's commission from ¾ of 1 per cent, as provided for in the agreement of May, 1918, to 1 per cent in the recently issued shipping agreement. There are hopes that in due course a commission of 1¼ per cent will be granted. The lower percentage, it is understood, was fixed in view of the high charter rates which have prevailed during the war.

All charters made between neutral owners and American firms must be approved by the shipping board. The policy of the board has been to fix a maximum rate, and this is still 35s. In other respects, there is now a free chartering market, and several charters have been made below the figure of 35s. There is much uncertainty in the market and many shippers and shipping firms are inclined to play a waiting game.

MARKET UPSET

High Oriental Rate Affects Pacific Market—Insurance Rates Up—Plan Use of Hun Ships

Some measure of hope of a better popular understanding of the marine situation is held out in the various manifestations of public appreciation. Most of the powerful commercial organizations have undertaken either to appoint special committees to deal with shipping subjects or have announced their intention of dealing specifically with the problem at their general meetings. The American Bankers' association has appointed a committee of 15 prominent bankers to serve as a committee on commerce and marine. Robert F. Maddox, Atlanta, Ga., heads the committee. The National Foreign Trade council has announced the marine question to be the main subject for discussion at its next general meeting in Chicago.

The shipping board has called in a committee of experts to advise with it upon the best plans for altering the design of the cargo vessels built during the war emergency and to change the plans of the ships now under construction or contract in order to make them better adapted to peace-time usage. The committee consists of J. A. Farrell, president of the United States Steel Corp.; P. A. S. Franklin, president of the International Mercantile Marine Co.; George S. Dearborn, president of the American-Hawaiian Steamship Co.; H. H. Raymond, of the Clyde and Mallory lines, and F. D. M. Strachan, president of the Strachan Shipping Corp.

Insurance Rates Advance

Insurance underwriters have a growing business and, in view of the losses sustained this winter and the rough weather now reported, reports have been heard of advancing the rates. The larger amount of business, however, it would seem has distributed the risks more generally and the removal of mines and other dangers to navigation may pave the way to lower rates. Lower insurance rates, however, are not immediately expected. In the new federal tax bill it is proposed to levy a special tax of 5 per cent on marine insurance business written by cable transfer in the United States with a foreign insurance company. The effect of this, it would seem, would be to penalize any vessel which desired to take out insurance in a foreign country, and make it possible for the domestic insurance companies to advance their rates in proportion to the 5 per cent tax. The legislators in Washington, undoubtedly, aim to give encouragement to the building up of American maritime business and the tax was subscribed to on that account.

The position of the underwriter is becoming one of more independence every day. Business is developing with such rapidity that the time has now come

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when practically every company has about all it can handle. Five years ago there were 58 companies authorized to do marine insurance business in New York, while at the present time there are double that number and the number is increasing monthly.

Pacific Market Upset

When the United States shipping board announced early this month that Emergency Fleet steamers would be placed on the berth for Oriental ports carrying freight for $30 per ton, it upset the entire Pacific market. Since then, rates have been declining steadily. Now it is reported that space is being offered at $2.50 per ton less than the government rate whereas only a month ago the going rate on freight to the Orient was $45 per ton.

Four shipping board vessels have been assigned to Seattle operating companies to load for Oriental ports at $30 per ton and most of the space has already been engaged. However, none of these vessels has sailed inasmuch as they are completing at local yards and the present strike is retarding their delivery. Reports from Japan state that the charter market in that country is dropping rapidly and the situation is chaotic. For months, Japanese owners have been reaping immense profits and the announcement of the United States has created consternation. For the first time in months, the supply of tonnage is said to exceed the present demand. Another bearish factor is the release of a considerable fleet of Japanese steamers which since last year have been operating in the Atlantic under charter to the United States. These ships are returning to north Pacific ports and this additional space is aiding in lowering rates.

As an indication of the market, new British steel steamers are being offered for time charter to Pacific operators at 25 shillings per deadweight ton per month for a period of 18 months. These vessels are to be delivered at United Kingdom ports in March. In view of the rapidly falling freights, even this figure is not especially attractive as operators fear there will be an additional drop in the near future. Inasmuch as the charter market for time vessels reached the high level of 97½ shillings, last October, the extent of the drop is easily seen. However, freights are far above normal yet when it is recalled that prior to the war, steamers were frequently chartered at around 3 shillings per month and 5 shillings was considered a profitable figure. It is true that the recent crash in charter rates naturally was more severely felt in Japan where the market was based on supply and demand than in the United States where operators have been unable to charter for months because the going rate for time charters was twice the maximum fixed by the United States government, which was 41½ shillings.

Lumber Rates Stay Up

The rates on lumber from North Pacific ports have not fallen with Oriental freights. The reason for this is that practically the entire lumber carrying fleet in Pacific waters has been fixed for months in advance at high levels and there is little activity in this market. Foreign lumber buyers are not active, anticipating a further drop in freights and in the meantime little new business is being booked.

Freight rates from the Orient to North Pacific ports continue low although several items moving in large quantities have been removed from the restricted list. Freight can still be carried from Japan to this coast at below $10 per ton but it is likely that with a resumption of normal cargo movement to the North Pacific eastbound rates will stiffen and westbound will relax until they reach a common level.

In the opinion of well informed operators and owners, the present is a period of readjustment during which freights are likely to continue to drop rapidly. Then they expect freights to adjust themselves to the matter of supply and demand. If the United States places sufficient vessels on the Oriental routes to hold the balance of power, reasonable freights may be expected in this trade. With increased tonnage available, the freight congestion at North Pacific ports is being gradually relieved.

Boston Shipments Fall off

Heavy shipments of provisions left Boston for Liverpool in January, the items including 11,500,000 pounds of lard, 13,000 boxes of bacon, 7000 quarters of fresh beef and 1,600,000 pounds of butter. Apples totaled 38,000 barrels and 92,000 boxes. During the month, seven oversea steamships carried 752,000 bushels of wheat and oats, a marked falling off compared with 2,800,000 bushels the preceding month. A year ago there were exported 875,000 bushels of wheat and oats. Last month about 9000 tons of corn meal and corn flour were exported of which amount 4200 tons were for Rotterdam and the remainder for Havana. These substitutes for flour were owned by the United States government and had been a long time awaiting tonnage. Up to the present time 151,092 barrels of apples have been shipped to Liverpool against none last year. Bad weather at sea and interrupted schedules were responsible for the relatively small number of steamships at Boston in January and February business will be about normal, it is expected.

Atlantic-Pacific Service

The long anticipated resumption of ocean freight service between Atlantic and Pacific coast ports became a reality early in February when the Pacific Coast Steamship Co.'s steamer ADMIRAL SEBREE went on berth in New York city and began loading cargo for San Francisco. This vessel was released to her owners by the shipping board and will be returned without delay to the Pacific trade, taking a cargo with her from the Atlantic coast. The ADMIRAL SEBREE is the first of six vessels which are soon to sail from the Atlantic to the Pacific, via the Panama canal, instituting a sporadic and uncertain service.

But the premise of the railroad administration that there is no water competition from coast to coast is apt to be overturned at no late date. This opinion is based on conclusions drawn from an investigation recently conducted which disclosed the possibility of merchants on the east coast chartering tramps to bring cargoes to the Pacific coast. Even at the present high charter rates, it is believed that such vessels might compete with the transcontinental railroads through the co-operation of the merchants in preparing cargoes for shipment and by taking every possible step to expedite the movement of the steamers.

Despite the government's recent action in releasing all American steamers from requisition charter, there seems to be but little possibility of the resumption of regular Panama canal service in the near future. It is too much to expect that such concerns as the American-Hawaiian and Luckenbach will soon resume.

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Marine Railway Supplants Drydock

How an Ocean Going Vessel Was Hauled Out of Water for Reconstruction in Absence of Docking Facilities

AN interesting operation in marine work was recently successfully carried out by the National Shipbuilding Co., Ltd., Goderich, Ont., at its Levis yard, Quebec, Canada.

The company had undertaken to convert an ocean-going steel dredge into a freighter for a group of French shipowners, for quick delivery and as there was no drydock available in which to carry out the work, the company decided to bring the vessel out of the water on a marine railway.

A suitable site was selected on the St. Lawrence river opposite Quebec and active operations were immediately commenced on the construction of the slipway, together with all the necessary shops and buildings required in a modern shipyard.

As it was impossible to secure the necessary machinery and appliances for a regular marine railway in the limited time available it was decided to use greased ways instead of the usual steel rollers.

The grade of the slipway was fixed at 4 per cent and it was found that if advantage was taken of the highest tides for floating the vessel onto the cradle, a total vertical lift of 11 feet would be sufficient to insure the stern being above high water mark for the remainder of the season. This lift, on a 4 per cent grade fixed the hauling distance as 275 feet and the length of the slip at 508 feet. The length of the vessel was 233 feet. This plus the haul made 275 feet. The length of the slip, however, was subsequently reduced to 485 feet as the bow of the vessel was allowed to overhang the cradle by 23 feet.

Rapid Repairs on Large Vessel

THE practice of hauling out yachts and other small craft on a marine railway is not uncommon but when in the absence of a drydock this method is applied to a steel vessel 233 feet long, it is evident that much careful planning is necessary to insure success.

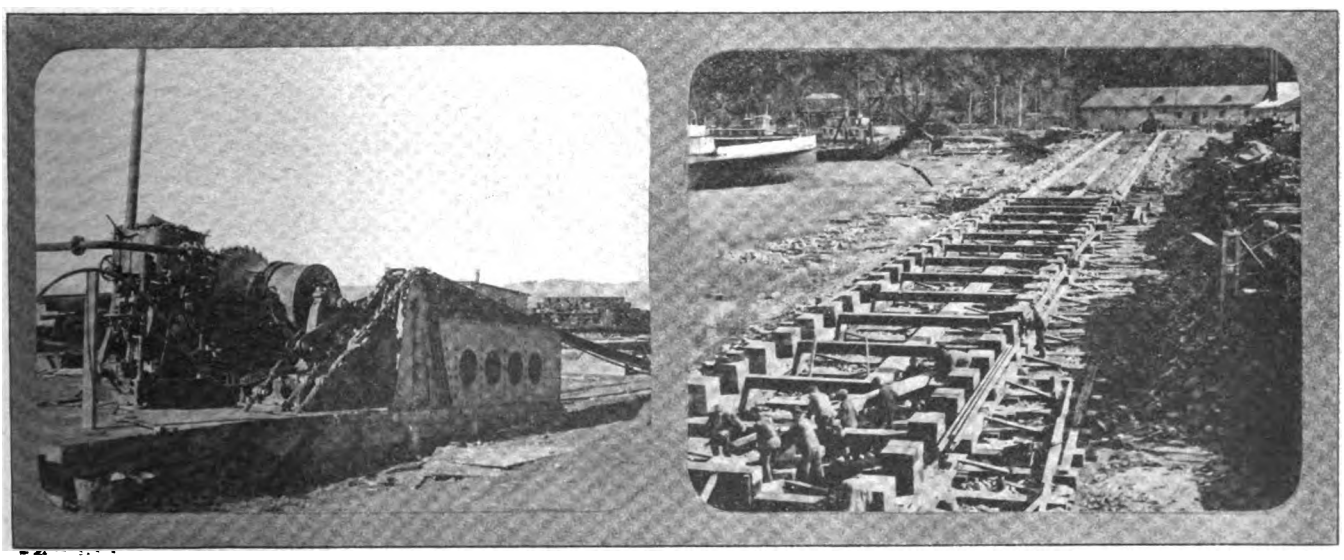
The accompanying article describes in detail how this was carried out, how the ways were constructed and how the vessel was hauled out of the water. An interesting feature of the operation is that greased wooden ways were used instead of the steel rollers regularly used in marine railway equipment.

The construction work on the ways was carried out in a thorough manner for while they had been given no camber, the weight of the vessel did not cause them to settle and nothing was displaced or broken. The manner in which power was applied for hauling, while simple in application, gave excellent results and the whole operation of hauling progressed without mishap.

The site selected for the operations contained a wharf of sufficient width to allow the upper portion of the slip to be excavated for a length of 225 feet, the material with which this wharf had been originally filled being shale debris from the adjoining cliffs and providing a good foundation for the ways. Beyond the wharf, soundings taken in the river showed from 4 to 5 feet of mud and blue clay overlying the rock. Although it would have been preferable to have carried the foundation of the ways down to rock, it was realized that as work could only be carried on during low tide it would require the remainder of the season to clear the site. Consequently, the mud only was removed and the cross timbers laid on the blue clay.

The cross timbers, 12 x 12 inches x 40 feet long, of fir, were laid at 4-foot centers, the next course above being composed of longitudinals and above this cross timbers again, the whole cribwork being filled in with rock and shale from the wharf excavation.

The standing ways were constructed of two 12 x 12-inch oak baulks bolted together with 1-inch bolts at 5-foot centers, the bolts also passing through the 6 x 15-inch oak guides fixed on the outside of the ways and projecting 3 inches above the



AT THE LEFT IS SHOWN THE HAULING GEAR CONSISTING OF A STEAM ENGINE, GEARED TO A WINDING DRUM BY MEANS OF WORM GEARING, AND THE ARRANGEMENT FOR ANCHORING AND SUPPORTING THE 4-SHEAVE BLOCK USED IN HAULING—THE VIEW AT THE RIGHT SHOWS CONSTRUCTION WORK ON THE CRADLE WHICH IS BUILT DIRECTLY ON THE STANDING WAYS

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surface to hold the sliding ways in position.

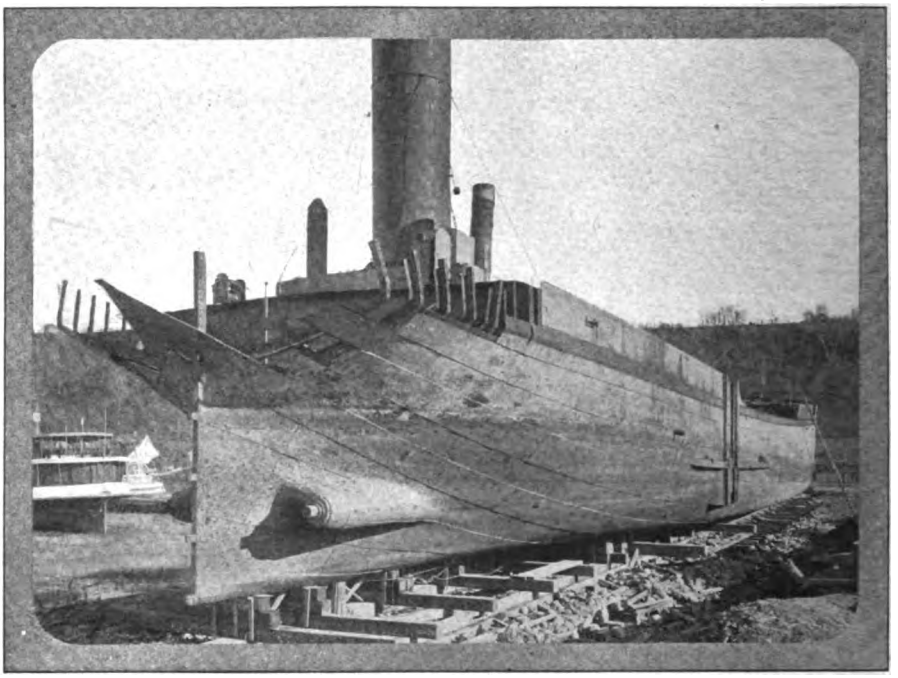
A center way was also provided for a certain distance to carry the stern of the vessel where the engines and boilers were situated and where the lines of the hull did not allow the stern to be supported on the side ways.

The sliding ways carrying the cradle, 210 feet in length, were also of oak, a center way 75 feet in length being also provided to carry the stern of the vessel where the greatest weight was concentrated. Timbers 12 x 12 inches x 24 feet long were laid across the sliding ways at 10-foot centers with short blocks in between so that the vessel would be supported by blocking at 5-foot centers throughout the length of the cradle.

Allows Liberal Margin

This blocking was carried up to a height of 4 feet above the standing ways at the after end of the cradle and 2 feet 6 inches at the forward end, these heights being fixed by the draft of the vessel fore and aft and the estimated elevation of the tide on the day fixed for the hauling operation. A margin of 2 feet was allowed between tide and draft for clearance and vagaries of tides which were found to vary considerably from the tide tables when the wind was in certain directions.

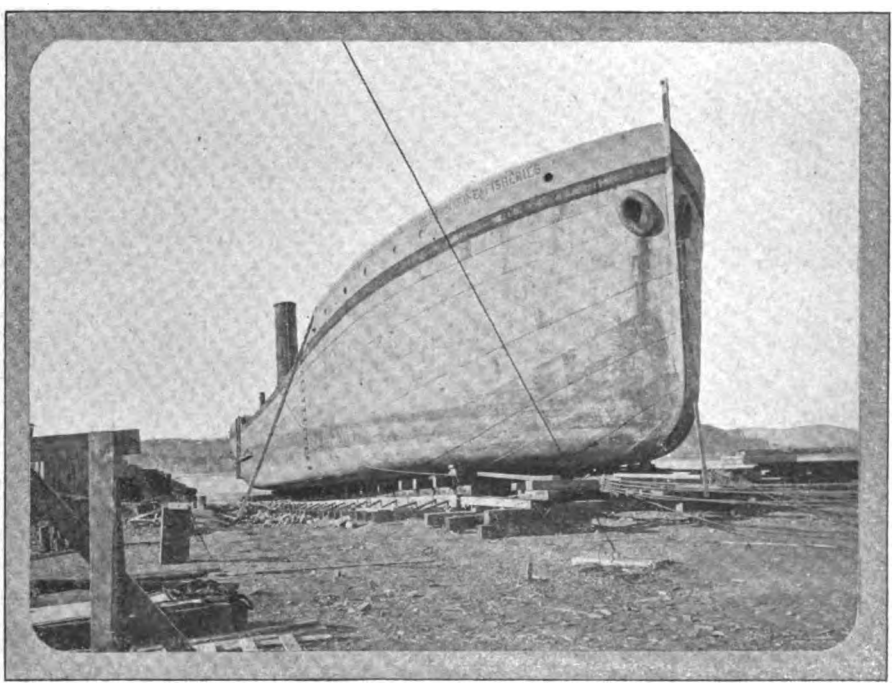
During the construction of the slipway, a large gang was employed cutting away and removing all parts of the vessel not required in the reconstruction. The engines and boilers, however, remained in position and the total weight when placed on the cradle was approximately 1000 tons. The dimensions of the vessel were 233 feet between perpendiculars and 39-foot beam.



STERN VIEW OF THE VESSEL—SHE WAS STRIPPED OF BULWARKS, BRIDGE DECK AND ALL TOP HAMPER DOWN TO THE MAIN DECK

A somewhat difficult problem to solve was the pull required to overcome the initial inertia on greased ways on a 4 per cent grade though it was considered that once this inertia was overcome the coefficient of friction would not be higher than 0.10 which on the 4 per cent grade represented a total pull of about 140 tons. This difficulty, however, was successfully overcome in the manner described.

The hauling engine and drum were bolted down to a heavy concrete foundation weighing approximately 150 tons and also anchored back with 1¼-inch steel rods. Two 2½-inch steel cables were attached to the rear end of the cradle and passed forward beneath the cradle to the forward end where they were shackled to two heavy 4-sheave steel blocks; ⅞-inch steel cables were reaved over three sheaves in each block making a 7-part line on either side extending to similar blocks fixed in front of the winding drum. The distance between the blocks was 313 feet, each cable being 2500 feet long.



THE MORNING AFTER THE VESSEL WAS HAULED OUT OF THE WATER—AS SHE RESTED HIGH AND DRY, READY FOR THE RECONSTRUCTION WORK

Cradle Weighted in Place

The cradle was erected in position at the lower end of the ways and weighted with rails and rock, three timber uprights bolted on one side, 50 feet apart and exactly 19 feet 6 inches from the center line, acting as guides for bringing the vessel into correct position. A fourth upright was fixed on the center line 23 feet forward of the cradle for locating the position of the bows.

The high tide occurring at night made the operation a more difficult one. The vessel was warped into position by cables attached to the wharf on one side and to an anchor and tug on the other. At 8 p. m. high tide was over the submerged cradle, at 8:45 the bows had settled on the blocks at the forward end and

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Progress Made With Stone Boats

Concrete Producers Have Developed New Material for Shipbuilding —Ships Cast in One True Monolithic Bond Offer Advantages

By V. G. Iden

INNOVATIONS in an established industry always arouse severe criticisms. This is the case today with ferroconcrete ship construction. Shipping people are frank in expressing their doubts as to the practicability of concrete vessels and are not as yet inclined to accept such ships for operation. On the other hand, many naval architects, shipbuilders and others of extended experience have been willing to lend their names and their reputations to this form of construction. Inspired by the cement producers of the United States, an organization has been started, known as the International Concrete Ship association with headquarters in New York for the purpose of assembling data on the most advanced and approved methods of building concrete ships and to promulgate information on the subject to anyone who might be interested in the matter.

At a recent meeting of this association no less an authority than Maj. Gen. George W. Goethals gave approval to the concrete ship. Frank Van Vleck attended the meeting by direction of the general and made this statement:

"I can say on behalf of General Goethals, that he is very much interested in the reinforced concrete ship, and he is willing to back up his reputation, as the builder of the Panama canal, made possible by reinforced concrete, on the building of concrete ships. He has asked the transportation division of the war department to commit itself definitely in regard to concrete boats."

Many others who are in a position to judge concrete construction and to judge shipping have shown equal positiveness that the concrete ship is a commercial possibility. Their opinions, of course, are based upon prospects rather than achievements and their faith rests in the improvement of the design rather than success had with vessels built of concrete in the past.

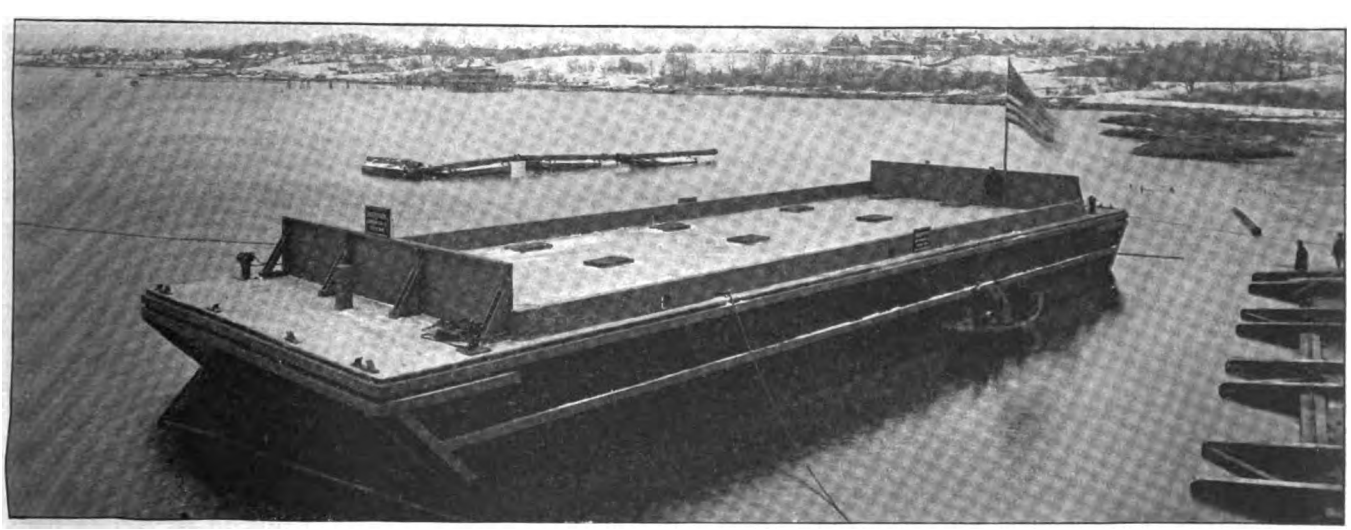
The industry had an enviable opportunity during the war when the shipping emergency was at its most acute stage. That more use was not made of this opportunity was because concrete shipbuilding was forced to begin at the ground and work up, whereas both steel and wood ship construction had established their commercial value throughout a period of many years. The history of concrete shipbuilding indicates but sporadic efforts on the part of a few daring builders.

Industry 70 Years Old

The first concrete boat of which any record can be found was built in 1849. This was nothing more than a small rowboat constructed by M. Lambot, of Carces, France. The manner of building was patented by the builder and the boat was exhibited at the world's fair held in Paris in 1855. This concrete rowboat was still in service at the outbreak of the European war. The next attempt was made by Gebruder Picha-Stevens at Sas van Gent, Holland, who built a rowboat of concrete in 1887 and named it the ZEEMEEUV. In February of last year it was still in use by a cement products plant in Amsterdam.

About 1897, Carlo Gabellini of Rome, Italy, began the construction of concrete scows and barges. The following year the reinforced concrete boat ETTORE was built by Gabellini which was of respectable finish and design. By 1905 the concrete boat-building work of this Italian had been so developed that a 150-ton barge was constructed for the city of Civita Vecchia. Results were so satisfactory that a number of additional boats and barges were ordered from Gabellini.

Following the precedent established by those who had experimented with concrete for boat building in Holland, German shipbuilders constructed in 1909 at Frankfort-on-the-Main, a concrete freighter of 220 tons. Rectangular compartments formed watertight bulkheads in the structure and a small after-cabin was added to complete the vessel. The same year A. A. Boon of Amsterdam built the JULIANA in Holland. An old wooden vessel which had become unseaworthy was used as an inner form. A netting was constructed of ¼-inch bars spaced so as to form meshes 2 inches square. This was assembled in place outside the old hull and covered with fine wire mesh, then filled in and covered with con-



FIRST CONCRETE BOAT TO BE LAUNCHED IN NEW ENGLAND—THIS CRAFT IS THE FIRST OF A NUMBER OF LIGHTERS NOW UNDER CONSTRUCTION BY THE ABERTHAW CONSTRUCTION CO.

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crete to a thickness of about 4 inches.

But the one example of concrete construction that has come in for more notice and comment perhaps than any other early attempt is that of a barge built in 1910 for use on the Welland canal, Canada. This barge was named the PIONEER and has been used principally to carry stone. The barge measures 24 x 80 feet and has a draft of 7 feet. At times, whole carloads of stones from dump cars have been dropped upon its deck from a 12-foot trestle, without injury to the vessel. In 1910, builders in Holland continued their output of concrete barges with considerable success. A special design of concrete lighter for extensive use on the Dutch canals for the transport of ashes and other refuse was designed. These lighters are 46 feet 8 inches long, and 10 feet beam. They have a carrying capacity of 15 tons.

Builds Several Scows

In 1912 the First Concrete Scow Construction Co. built a 500-ton concrete scow for the Arundel Sand & Gravel Co., Baltimore. Several scows and barges of this type have been in use for four years or more on Chesapeake bay or tributary waters in the vicinity of Baltimore. The same year Johannes Lescher of Dresden, Germany, launched a concrete sailboat. She has been subjected to severe handling but has given excellent service.

The year 1912 marked a revival of interest in concrete boat construction. The Gabellini method of construction was used in the building of a concrete barge at Mobile, Ala., which has met with rough treatment in the Gulf. The barge is now being used to transport fuel oil on waters adjacent to the Gulf of Mexico. A concrete barge, 100 feet x 28 feet, was built for use on the Manchester ship canal, England. She carries sludge pumps, boilers and fuel. Since 1912 many concrete barges have been in use on various English canals.

Four concrete pontoons were built on the Panama canal in 1914. Four more were built in 1916. These are used as landing stages for small steamers. A harbor pontoon was built of concrete in 1914 by the Sydney Harbor Trust Co., Sydney, New South Wales. This is 100 feet long, ranges in beam from 53 to 67 feet, has a draft of 7 feet 9 inches and a total displacement of 783 tons. It has been subjected to severe treatment from the ferries using it as a landing stage.

In August, 1917, a 200-ton concrete power lighter was launched at the plant of the Porsgrund Cement Casting Works, Porsgrund, Norway. The Porsgrund plant builds its boats bottom up, an internal mold being used which is made in units that can readily be taken apart and reassembled. The vessel is launched in the same position in which built and by taking advantage of a special design of interior compartments, a small amount of water is admitted so that the vessel, soon after launching, rights itself. But probably no company made greater strides in the use of concrete for building ships than the Fougner Steel Concrete Shipbuilding Co., Moss, Norway. This company developed a type of 100-ton concrete lighter which is used by the Norwegian navy. Among other works of the Fougner company are concrete drydocks. The first dock built by this company accommodates boats up to 75 feet long by 25 feet wide and has a lifting capacity of 100 tons. This company built a 200-ton concrete cargo vessel in the summer of 1917, which vessel shortly afterward made its first trip from Norway to England. The boat is driven by a 70-horsepower motor and carries enough fuel for a trip from Norway to England and return.

In 1918 England also took up concrete boat construction in earnest. France began to standardize her concrete shipbuilding and in Spain work was begun on vessels ranging in size up to 6000 tons. At the same time, the United States showed its courage by building the 5000-ton cargo boat FAITH.

First Large Ship

The FAITH, first of the large cargo boats built of concrete, has afforded shipping experts an opportunity to study the commercial possibilities of this method of marine construction. In a measure the FAITH has indicated the limitations of concrete ships although the concrete advocates are not entirely satisfied. This vessel has been in continuous service for nearly a year, encountering the severest weather and maintaining an almost perfect record. She has made a better record than some of the steel boats put together in record time. Since building the FAITH, rapid strides have been made in the improvement of concrete craft construction. Practical studies have been made with strains and stresses and the lines of concrete ships have been altered in accordance. Furthermore, a lighter and stronger concrete has been successfully developed and demonstrated. New methods have been successfully introduced in the building of the vessels, making possible unexpected reduction in total weight.

Standard concrete weighs approximately 150 pounds per cubic foot. This was good for structural purposes but it has been desirable to obtain a lighter weight for marine construction in order to compete with steel. Only by so doing could the deadweight of the ships be brought to a competitive relation with steel construction. The FAITH was reinforced much more securely than ordinary construction work. Some authorities think she has too much reinforcement. The concrete experts made many experiments with numerous substances and finally fixed upon a burnt shale-clay. This resembles in appearance certain volcanic rufas of the Pacific coast. The basic clay from which this marine concrete is produced is said to be found in various localities. Practically identical clay is found in Alabama, New Jersey, Missouri and California. It can be burned in any modern kiln and its production is comparatively simple.

Weight is a Detriment

In the average cargo ship built of steel, the deadweight is from 70 to 75 per cent of the displacement, when taking into account as weight of ship all spars, fittings, deck houses, anchors and chains, auxiliary engines and tanks, but not boilers, engines or coal. In the wooden ship the deadweight is approximately 60 per cent of the displacement. It is evident, from the difference in weight of materials, that the chief difficulty has been to design a ship of concrete that will give a relationship between deadweight and displacement approaching that of steel. Experiments in burning lighter weight concrete have been conducted for the purpose of proving that concrete ships can be made commercially successful, that the weight of the ship can be such as to provide a reasonable deadweight or cargo capacity in relation to the displacement.

Experts have been called together to study the questions of design. It was determined that concrete members could be designed to stand the traverse stresses just as well as steel members. Steel reinforcing was determined upon, however, to take up the longitudinal tensile stresses, whereas concrete assisted by the steel was relied upon to take the compressive longitudinal stresses. The experts decided that concrete had enough elasticity for the work in hand. These were the points determined upon prior to the building of large cargo boats of this material. Actual experiments have altered the opinions of many experts since. The FAITH, for instance, was found to set down close on the water. She did not ride the waves like a steel ship and therefore there is a great modification in the strains and stresses in

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a heavy sea. In time considerable improvements may be made in design. At least this is a worthy problem for ship architects to work upon. The field of research is new.

Experiments in developing a better concrete for shipbuilding have been conducted with collision, stranding and fire hazards in mind. To make a practical ship of this material it is necessary to satisfy the marine underwriters on all these points and the concrete people have approached their problem with this in mind. The new concrete, consisting of a shale which burns at about 2400 degrees and cement burning at approximately 2600 degrees, gives a homogeneous mass which shows upon test no deterioration when burned to 2000 degrees Fahr. Here is the first advantage shown over steel ships, because it has been demonstrated that steel plates will buckle at 700 degrees. The heat test proves the great advantage the special concrete has over the standard concrete. For instance gravel, containing from 9 to 20 different kinds of rock per cubic foot with the resultant variation in expansion and contraction, would not stand near the degree of heat which the special concrete will.

Results of Experiments

It was of this new kind of concrete that the ATLANTUS was built and this is the kind which, from present indications, will be used in all the better grades of concrete shipbuilding in the future. The manner of the discovery of this grade of material is interesting in itself. An American cement expert was in Germany some time before the war when it was discovered that the Germans were using clinker in concrete because of its lighter aggregate. When the concrete shipbuilding program was started in the United States during the war this discovery was brought to mind and immediately some experiments at the bureau of standards in Washington were started. From 10 to 12 per cent of carbon coal was included in the mass and made into briquets. These were put through a kiln at 2400 degrees for 80 minutes and expanded to about 10 times the original size. The treatment left in the product millions of hermetically sealed voids. This product in a 1 to 3 mixture tested for compression gave an average of 4750 pounds per square inch in 7 days, and over 9000 pounds in 28 days, and weighed on an average 105 pounds per cubic foot. A density test showed less than 2.5 per cent moisture.

The shipbuilding concrete is made from a cement which is produced in a special, although not highly involved, manner. The material is subjected to raw grinding, using the proper chemical analysis and even temperature of heat in calcining. The clinker is aged for not less than 30 days and then ground to a fineness of 95 per cent through 200-mesh on the finish. Cement producers have become familiar with this special material in a surprisingly short time. Some American producers are today shipping it to Japan for shipbuilding and a promising French inquiry has been received. The American producers have become highly expert in the burning of the cement, having surpassed all foreign producers in this.

Record Voyage for Troop Ship

WHEN the EMPRESS OF ASIA, *Canadian Pacific liner, recently slowed down her engines to enter Vancouver harbor she completed a remarkable ocean voyage. Carrying* 1500 *soldiers of the Canadian expeditionary forces bound for their homes in British Columbia and Alberta, she steamed all the way from Liverpool, a distance of* 8586 *nautical miles. The route taken was by way of the Panama canal.*

This is, without a doubt, the longest voyage taken by any troops participating in the world war. The first lap of the journey to the Panama canal is approximately 4530 *miles, while the distance from the canal to Vancouver is about* 4056 *miles.*

The huge liner was turned over for service as a transport shortly after the war broke out. She was returned to commercial service between Vancouver and the Orient after debarking her contingent of troops.

Developing Light Aggregates

But the American cement producers are not entirely satisfied with the phenomenal advance already made. They are today developing still further the light aggregate, using fullers' earth which weighs 25 pounds per cubic foot. This, mixed with blue clay or shale, running reasonably high in aluminum and iron oxides and about 10 per cent of carbonate of coal, is finely ground. It is anticipated that, when the experiments are completed, this aggregate will equal if not exceed in strength the present improved concrete, and will weigh about 80 pounds per cubic foot. It is hoped by these experiments to develop a commercial concrete of one-half the weight of standard concrete, and of equal if not greater strength.

The strength of the material having been established, it would seem that the lighter aggregate has advanced the art of concrete shipbuilding by many years. Tests of elasticity have shown that concrete exceeds steel. A test panel of reinforced concrete, 7 inches thick and 20 feet square, was deflected 8 inches. When the load was removed the panel came back to within $\frac{3}{8}$-inch of its original position. Taking all elements into consideration, it has been reckoned that 2-inch reinforced concrete matches a ½-inch steel plate. The FAITH has walls 4 inches thick, and the ATLANTUS has walls approximately 5 inches thick. That should be equal to 1-inch steel plates in the case of the first and 1¼-inch steel plates in the case of the second, had those vessels been built of steel.

Tests Antifouling Coating

Building seagoing vessels of concrete has also prompted many experiments in other materials incident to shipping. For instance, an antifouling coating is being used on the outside of the concrete ship up as far as the water line. Many kinds of materials have been proposed for this work and one preparation is of a cement nature which gives a true bond on the concrete, using about 10 per cent of copper. This corrects the porosity of the concrete should any particular mixture be deficient in that regard and also renders it acid proof. It is said to be impossible for barnacles to attach themselves to the side of a concrete vessel coated with this mixture for any great length of time, the granular nature of the coating failing to give barnacles a hold such as is afforded by the fatty mixture of ordinary paint. The builders insist that it is not necessary to paint a concrete ship except for the sake of appearance.

Sensitive instruments were attached to the FAITH that all strains and stresses might be studied. These instruments indicated but little vibration, which, it is insisted, proves the value of having a true monolithic type of construction with perfect bond. Such a ship does not rely solely on the concrete for its strength, but all the strains are figured out to be resisted by concrete and steel. All rods are electrically welded together so that each strand is continuous. The ribs, or frame, are designed in the same manner as for steel ships and outside of them is a network of welded rein-

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forcing, making a continuous bond with the decks, ribs, bulkheads and beams. The concrete is placed by the best method possible for strength and density. It is proposed in future construction that concrete ships shall be built, including all the housing, staterooms, and even to the decorations, in one true monolythic bond. Both the American Register and Lloyd's will give A-1 rating to concrete ships constructed from approved plans and specifications.

Construction done for the Emergency Fleet corporation includes many specifications which some shipping experts contend are over-cautious. In ordinary reinforced concrete, 1 per cent or 2 per cent of steel reinforcement in a concrete beam in a building is thought excessive. The shipping board has been experimenting with 5 per cent, 6 per cent and 7 per cent of reinforcement, in order to develop the shearing stresses which their experts consider necessary in order to get a ship that is a commercial proposition. Steel arranged both diagonally and vertically has been used. Diagonal steel was used in the FAITH. Steel so placed is stressed not only because of the diagonal tension present, but is also stressed by the longitudinal movements. When the steel is placed vertically, any stresses due to longitudinal bending point are eliminated. Experts are not agreed which is the better method.

Ample Safety Factor

The steamer FAITH is said to contain more reinforcing than is necessary, and an even greater amount was put in the ATLANTUS. Some experts declare that from 5 to 6 times more reinforcing steel than was necessary was put into these two ships. But it was acknowledged that the Emergency Fleet corporation adopted a safety factor of 4 in the construction of its ships because it was not desired to run the least risk. The extra reinforcing in the ATLANTUS was placed on the decks and around hatch combings. More steel was also distributed throughout the ship. There is about ⅜ inch thickness to the concrete between the reinforcing and the outside skin. The FAITH has a deadweight of 5000 tons and a gross of 2650 tons. The ATLANTUS has a deadweight of 3500 tons, and her carrying capacity in proportion to her measurement is undoubtedly less than that of the FAITH. In proportion to steel ships, however, it is declared, the speed of the concrete boat is greater for equal engine power because the friction in the water is less.

Experiments carried forward in America are solely responsible for this enviable position accorded the special concrete ship design developed here. Great Britain, it is true, is building now some 200 vessels of concrete, and France about 400 of the same material. Spain has already put into service one 6000-ton concrete ship and plans to build a total of 2,000,000 tons of shipping of this material. Italy has a concrete shipbuilding program under consideration of equal magnitude to that of Spain. And inquiries from Japan, New Zealand, and Australia indicate that the new method of building ships is rapidly spreading around the world.

Forms Present Some Troubles

In pouring the cement on the frames or reinforcing many improvements have been projected. Approximately 85 per cent of the trouble encountered in building vessels of concrete, it has been said, is due to forms. The concrete experts, therefore, are striving to work out a method whereby the vessels can be built without forms. The reinforcing is fabricated and a metal lath is used for the purpose of a form. The cement is then to be placed by use of the cement gun. In this method of construction it would be necessary to have an outside skin of less than 2 inches. In another case the frames are precast and set into position and the concrete hull built around. Cement barges have been successfully built by this latter method. The experts insist that it is not necessary that the continuous method of placing the concrete be adopted. One of the best methods of placing the concrete, both physically and economically, it is said, is that where the concrete is driven by compressed air in batches from the mixture to the destination. Just at the point of discharge the pressure is released by air valves or vents, giving any required pressure at the end of the nozzle. When concrete is delivered by the old method in the barrow, the mixture has a moment to settle and it is not delivered at its destination in its freshly mixed condition. The improvements made along these lines are the things which have done much to convince many shipping people that concrete shipbuilding is a practical thing. Improvements may be made in other directions, and the dream of a successful stone boat may yet have a practical realization.

To give the concrete boat its just consideration, it must be acknowledged that concrete shipbuilding in the United States is a new industry. During March, 1918, the Universal Shipbuilding Co., Sturgeon Bay, Wis., took contracts to build 12 reinforced concrete barges. During May of the same year J. L. Weller, Tonawanda, N. Y., took a contract for 30 tow barges. The Concrete Steel Shipbuilding Co., Savannah, Ga., undertook to build a concrete freighter; the S. S. Saxton Co., Chicago, projected work on five concrete tankers, and the Torcrete Shipbuilding Co., New Orleans, proposed to build oil barges of concrete. The Delta Shipbuilding Co., New Orleans, was at work on several river barges.

It was last August when the shipping board became definitely interested in concrete shipbuilding and decided to take over the FAITH which had been constructed on private account at San Francisco. Then the Emergency Fleet corporation entered upon its program to construct five agency yards in which large concrete freight boats are to be built. The agents for these yards are the Liberty Shipbuilding Co., Brunswick, Ga., and Wilmington, N. C.; A. Bentley & Sons, Jacksonville, Fla.; Fred T. Ley & Co., Mobile, Ala.; Scofield Engineering Co., San Diego, Cal., and the San Francisco Shipbuilding Co., San Francisco.

Awards Many Contracts

The war department also entered the field and obtained bids and awarded many contracts for concrete barges for the embarkation service. Among the awards made were contracts let to the Liberty Shipbuilding & Transportation Co., Cleveland; West Coast Shipbuilding Co., Everett, Wash.; Great Northern Shipbuilding Co., Portland, Oreg.; Samuel Beskin, Peekskill, N. Y.; Ambursen Construction Co., Pagoda, N. J., and Louis L. Brown, Inc., Verplank, N. Y. Many persons went into the concrete boat building business and an ever increasing interest has been shown in the industry. The Houston Bank & Trust Co., Houston, Tex., has had drawn up plans for two 2000-ton passenger ships which are intended to ply between Houston and Philadelphia.

A list of the persons and companies building watercraft of reinforced concrete today would be extensive. The number of bankers and naval architects, engineers, and other experts who have shown interest in the baby industry is tangible proof of the faith of influential men in the future outlook. No one is prepared to contend that a powered concrete vessel of today's construction equals or exceeds in utility a steel vessel of modern design. It is the fact that the field of developments in concrete shipbuilding is so large and so promising that prompts these people to pin their faith to it.

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Launch Stone Ship by New Method

First Barge of This Type Takes the Water at Cleveland—Craft is Launched Endwise—Water Ballast Relieves Launching Strain

By F. B. Jacobs

NEW methods of launching concrete ships were tested successfully at Cleveland recently. The craft is the first large concrete vessel built on the Great Lakes, a car float of 1500 tons displacement which was launched by the Liberty Shipbuilding & Transportation Co. Jan. 30. This vessel, which was described in THE MARINE REVIEW, December, 1918, is 265 feet long, 37 feet 2 inches beam, 11 feet 3 inches deep, with a maximum draft of 9 feet 3 inches. She is the first to be launched of six which the Liberty company is building for the government. Equipped with tracks on their decks, these vessels will be used as car floats in east coast harbors.

To launch a craft of this type endwise is a distinct departure from the methods employed in Great Lakes practice and the complete success of the undertaking is due to the careful planning on the part of the Liberty company's engineering department.

This vessel was poured in sectional forms which were so constructed that they could be removed and used again. The forms were supported by blocking built on the standing ways. In making preparations for launching, the first step was to remove the two outer sections of the forms. This left the vessel supported by the blocking under the center form on which the bottom of the vessel rested. The outside forms, however, ran to a point well inside the bilges.

Next, cribbing was built up at a point just inside the bilges. This cribbing was supplied with wedges—not for the purpose of raising the vessel, however, but for just the opposite object, that is, to let her down after the middle forms were removed. After this cribbing was all in place, the center forms were removed and the running ways built in place on the standing ways. These were, of course, thoroughly greased and as the vessel was still supported by the cribbing, no pressure was exerted on the ways to force out the lubricant. Thus the danger of the vessel not starting on her downward plunge as soon as she was released was practically eliminated.

Letting the Vessel Down

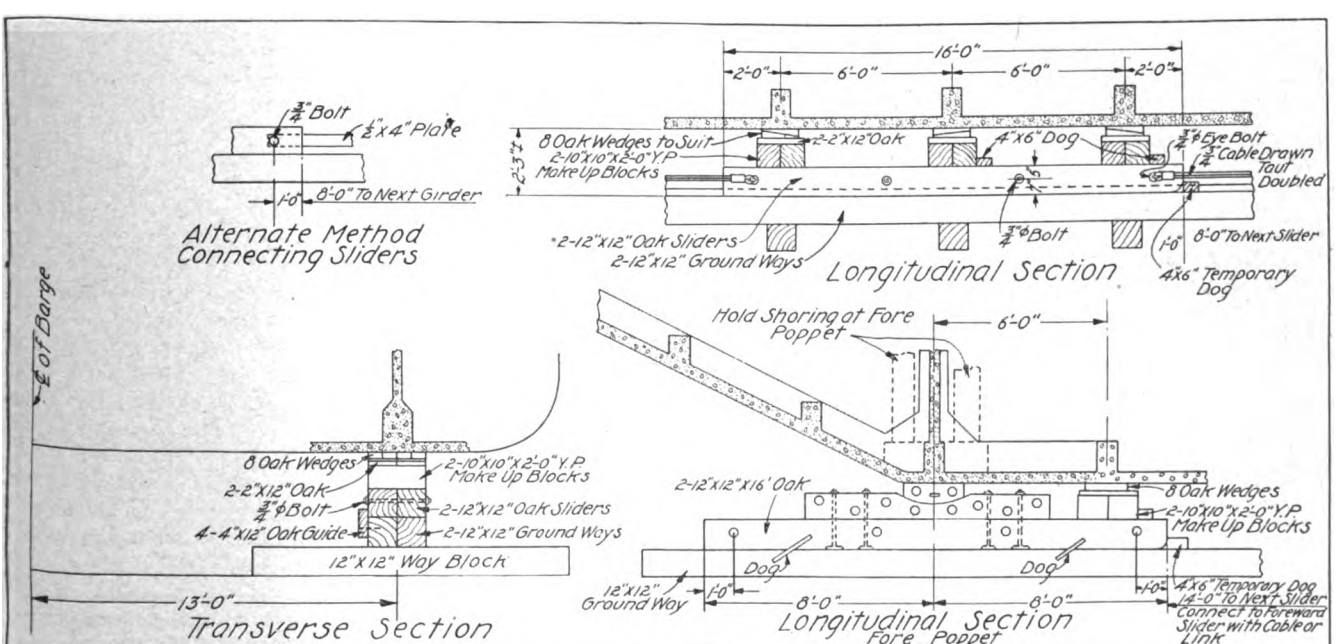
The next step was to knock out the wedges from the cribbing which let the vessel down on the running ways. At this time, all that held her were hemp cables secured to the running ways and a few emergency dogs to hold the running and standing ways together. Two of these dogs are shown in the accompanying illustration.

The standing ways were built with a pitch of ¾ inches to the foot and ran to a point 80 feet from the water's edge. When all was ready, the cables holding the running ways were cut and without a hitch the craft started. For an emergency, jacks had been provided.

In figuring the launching calculations, provision was made to have the vessel lift due to the buoyancy of the water when the stern poppet was 2.5 feet back of the crest of the ways. This was accomplished by placing 100 tons of water in the forepeak. The calculations were figured with such exactness that she actually lifted on her downward course within 1.2 feet of the point determined on. The addition of water in the forepeak reduced the breaking strain due to taking the water 100 per cent, the actual stress put on the vessel being a 4000-pound unit stress per square inch.

The accompanying illustration shows how the fore poppet was swiveled to keep an even strain on the vessel's bottom, the method used to tie sections of the running ways together and longitudinal and transverse detail sections.

The object of the swiveled fore poppet was to insure an even bearing on the vessel's bottom when she dipped while taking the water. The block and its seats are provided with a radius which was finished smoothly and thoroughly greased to insure its working properly when under pressure. The sliders, or sections of the running ways, were tied together to prevent piling up under the vessel, if one left the ways.



DETAILS OF METHOD USED IN LAUNCHING CONCRETE CAR FLOAT. THE FORE POPPET IS SWIVELED TO DISTRIBUTE THE STRAIN ON THE VESSEL AS SHE BECOMES WATERBORNE—THE SECTIONS OF THE RUNNING WAYS WERE TIED TOGETHER TO KEEP THEM IN PLACE

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Compare Electric Welding Methods

American and British Practice in Electric Welding Contrasted and Practical Examples Taken from Actual Work Are Described

By Commander S. V. Goodall R. N.

WITH respect to their attitude towards electric welding the various shipbuilders in America and Great Britain may be divided, roughly, into three classes.

(1) The very few who speak as though a riveted joint were the most sacred and efficient institution ever conferred by Divine Providence upon unworthy man.

(2) The very few (personally, the writer has not met a single one) who speak and dream of rivetless ships and noiseless shipyards, peopled largely by women.

(3) The great majority of shipbuilders who are too busy to develop new, though promising, methods, but who will employ any new process as soon as they are convinced that this is worth doing. To these are commended the matter and spirit of this paper. Their attention is called to the attitude of the British admiralty, the United States navy department, Lloyd's and the American bureau of shipping.

In October, 1917, not a recent date, considering the rate at which scientific matters now progress, the British admiralty called a conference of some of the most experienced constructors from various navy yards, and some of their recommendations were as follows:

(1) Although the covered electrode process of electric welding could not be advantageously adopted in all cases as a substitute for the present process of drilling, riveting, caulking, etc., yet its use would undoubtedly result in a great reduction in the amount of labor involved in such processes.

(2) While it was not considered that any advantage would accrue from the application of this process to the present arrangements of riveted non-watertight laps, butts, stiffeners, etc., all watertight work of this nature could probably be well and efficiently performed with economy in labor, by increasing the rivet spacing as much as possible, consistent with the proper closing of the work, and supplementing this by covered electrode arc welding to meet the requirements for strength and watertightness.

(3) By this system the process of watertesting would be greatly facilitated, with a corresponding saving in time and labor.

The United States navy department, Lloyd's and the American bureau of shipping have sanctioned the use of electric welding for angle staples, plate staples, and similar watertight work, in addition to its general use on such work as securing fittings, etc., to watertight bulkheads and decks, whereby not only are time and labor saved, but better watertightness is obtained.

Passing now to specific examples of electric welding, we will first speak of the American practice. It will be quickly seen that American and British practice differ considerably.

Fifth of a series of lectures on "Electric Welding" held at the Engineers' club, Philadelphia, under the auspices of the United States shipping board and published in The Journal of the Engineers' club. The author is a naval constructor, the British navy.

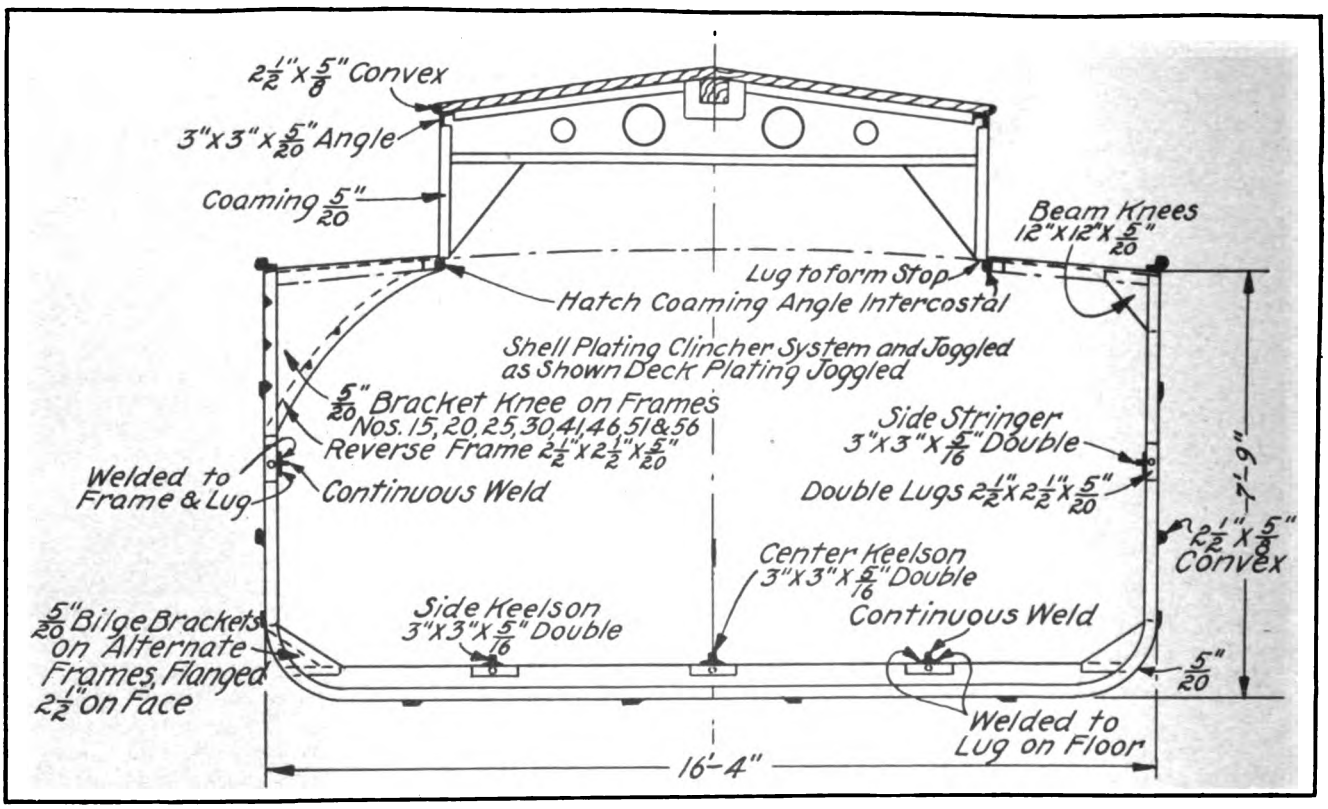
2½"x⅝" Convex
3"x3"x5/20" Angle
Coaming 5/20"
Beam Knees 12"x12"x5/20"
Lug to form Stop
Hatch Coaming Angle Intercostal
Shell Plating Clincher System and Joggled as Shown Deck Plating Joggled
5/20" Bracket Knee on Frames Nos. 15, 20, 25, 30, 41, 46, 51 & 56 Reverse Frame 2½"x2½"x5/20"
Side Stringer 3"x3"x5/16" Double
Welded to Frame & Lug
Continuous Weld
Double Lugs 2½"x2½"x5/20"
7'-9"
2½"x⅝" Convex
Center Keelson 3"x3"x5/16" Double
Continuous Weld
5/20" Bilge Brackets on Alternate Frames, Flanged 2½" on Face
Side Keelson 3"x3"x5/16" Double
5/20"
Welded to Lug on Floor
16'-4"

FIG. 1—MIDSHIP SECTION OF AN ARC WELDED BARGE—THIS VESSEL IS 125 FEET 9 INCHES LONG, 16 FEET 4 INCHES BEAM, 7 FEET 9 INCHES MOLDED DEPTH AND HAS A DEADWEIGHT CAPACITY OF 200 TONS—THE FRAMES ARE 2½ x 2½-INCH ANGLES—THE FLOORS ARE 7 x 3½ x 7/20 INCH-ANGLES. THE SHELL PLATING IS JOGGED AND LAPPED AT THE EDGES WITH STRAPS AT THE FLUSH BUTTS — THE DECK PLATING HAS STRAPPED BUTTS

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In Great Britain the process invariably used is the covered electrode. We are, however, openminded and desire to reduce costs so that any other system will find a fair field and no favor.

American Welding Practice

The following extracts from letters which the writer has received from some of the leading shipyards in America may be illustrative of the typical jobs to which electric welding is applied in the United States:

NEWPORT NEWS SHIPBUILDING & DRY DOCK CO.: We have been using electric welding for the past four years, and although it has been developed to quite an extent, we feel that much more work can be done by this method, as soon as the various inspectors realize the full value

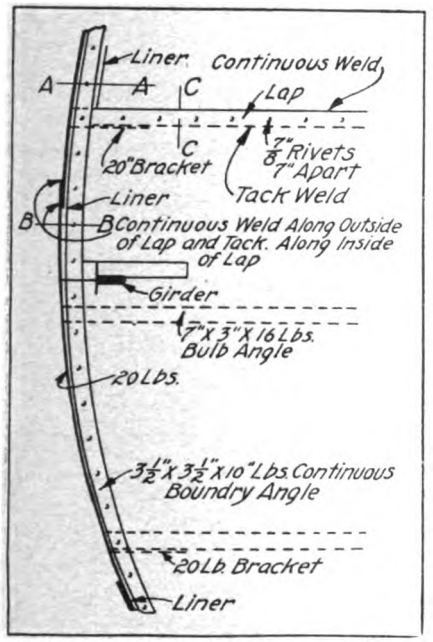

FIG. 2—ELECTRIC WELDING APPLIED TO THE CLINKER SYSTEM OF CONSTRUCTION—THIS ILLUSTRATION SHOWS THE WELDED SHELL PLATING

of electric welding and will allow its more extensive use.

Referring to your request for facts relative to the saving of time, labor and money which have been effected by the adoption of electric welding: The developments in connection with electric welding have been so rapid and the uses to which it has been put have been so extensive that we have not attempted to obtain comparative costs between this and other methods, having contented ourselves with the evident economy obtained by the electric method.

We are not in sympathy with the completely welded ship idea, but believe there is a happy medium limiting the extent of the electric welding, which, to a great degree, is determined by the personnel of the welding department and the experience to those who outline the work to be done by the electric method.

BETHLEHEM SHIPBUILDING CORP.: We are in the yard welding all the nonstrength clips and fittings to the destroyers, such as furniture clips, cocoa-matting strips, backing strips for sheathing, shelf clips, etc. The welding of these small jobs eliminates the work of punching the clips, laying off for drilling, bolting up and finally riveting. This work, it will be noted, is very much scattered, and therefore comes under the shipyard term of "odd work." Odd work is necessarily costly.

This work is now being done at a much reduced cost and in less time.

THE PANAMA CANAL, DEPARTMENT OF OPERATION AND MAINTENANCE: It may seem like a strange assertion to state that we do not employ anglesmiths in the shops, but we do not require them—all our angles are welded together by the oxy-acetylene and electric-welding processes.

Frames, staples, webs, brackets, sheetiron and steel boxes, leaky joints on ships' bottoms, plates of tanks, pipes and fractures in all kinds of ship machinery are welded. In fact, electric welding, oxy-acetylene welding and cutting and oxy-hydrogen cutting are so extensively used in ship work that they have become practically indispensable in their use to the mechanical division on account of the big saving in time, labor and cost.

From our own experience and through keeping in touch with this line of work being carried on in the industrial establishments in the United States and elsewhere, we have come to the conclusion that oxy-acetylene or electric arc and spot welding in their present stage of development cannot supplant all watertight ship work that is now being done by riveting, but it will be only a matter of time, due to the rapid strides made in the development of autogenous welding outfits, when all obstacles in this line of work will be overcome.

THE SUBMARINE BOAT CORP.: We are welding approximately 60 frames on each ship in addition to doing a great deal of miscellaneous welding in connection with outfitting of ships. The welding in outfitting has not yet fully developed. By this, we mean that we are daily finding additional places where electric welding can be used to advantage, and we are strongly inclined to push the use of welding to the limit, for the reason that we find it considerably cheaper than anglesmithing work for frames, and considerably cheaper and faster than drilling and tapping deck beams and bulkheads for attaching miscellaneous small brackets.

Spot Welding

Before leaving American practice, a few words should be said about spot welding. Prof. Comfort Adams has given his opinion as follows:

Electric spot-welded joints, properly made, are stronger than riveted joints.

The total labor required for the welding of a given number of spots is about one-quarter to one-fifth of that required for the same number of rivets.

The only fear that has been expressed by anyone in connection with the application of spot welding to shipbuilding is that crystallization may develop as a result of the ship's vibration. It is the opinion, however, of several able shipbuilders that the intensity of the vibrational stress in the structure of the ship is not sufficient to warrant this fear. In any case, it is hoped to plan such vibrational tests, in connection with the work of this subcommittee as to clear up this point.

Everyone with whom I have talked on this subject agrees that the probable gain by the substitution of spot-welded for riveted joints in shipbuilding is so great as to warrant the expenditure of every effort to give it a thorough trial.

Shipbuilders in Great Britain would be glad to profit from American experience. They certainly fear crystallization, the possibility of a poor joint through some defect between the faying surfaces, and also that the joint may ultimately fail through one weld being poor or taking an undue share of the load.

Passing now to British practice, and

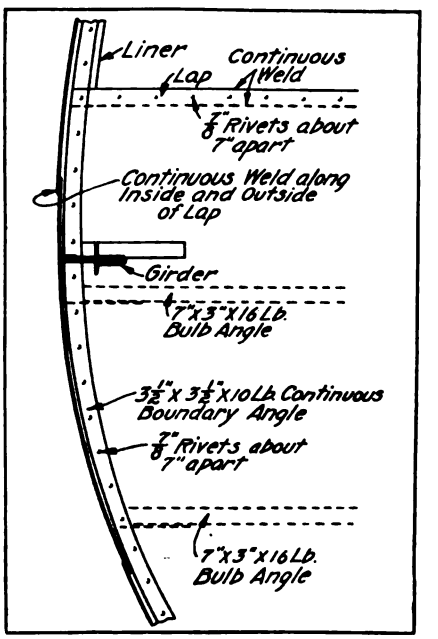
Liner
Continuous Weld
Lap
7" Rivets about 7" apart
Continuous Weld along Inside and Outside of Lap
Girder
7"x 3"x 16 Lb. Bulb Angle
3½"x 3½"x 10 Lb. Continuous Boundary Angle
7" Rivets about 7" apart
7"x 3"x 16 Lb. Bulb Angle

FIG. 3—RAISED AND SUNKEN SYSTEM WITH CONTINUOUS WELDS—THIS IS A TRANSVERSE SECTION SHOWING SHELL AND WATERTIGHT BULKHEAD PLATING AND CONNECTIONS

taking up first the question of repairs, the following typical instances are illustrative of the broad field to which electric arc welding has been applied in Great Britain, with great saving in both time and expense:

In one case, a ship with a number of fractures in the bottom plating was repaired by welding up the cracks after they had been "veed." This work was accomplished in 16 hours, whereas the renewal of plating would have involved the loss of that ship's services for many days.

In another case, a steel stem casting broken into five pieces by collision was repaired in seven days. To obtain a new casting would have required four to five months.

In other cases, ships which were experiencing trouble through leaky butts straps were repaired by welding

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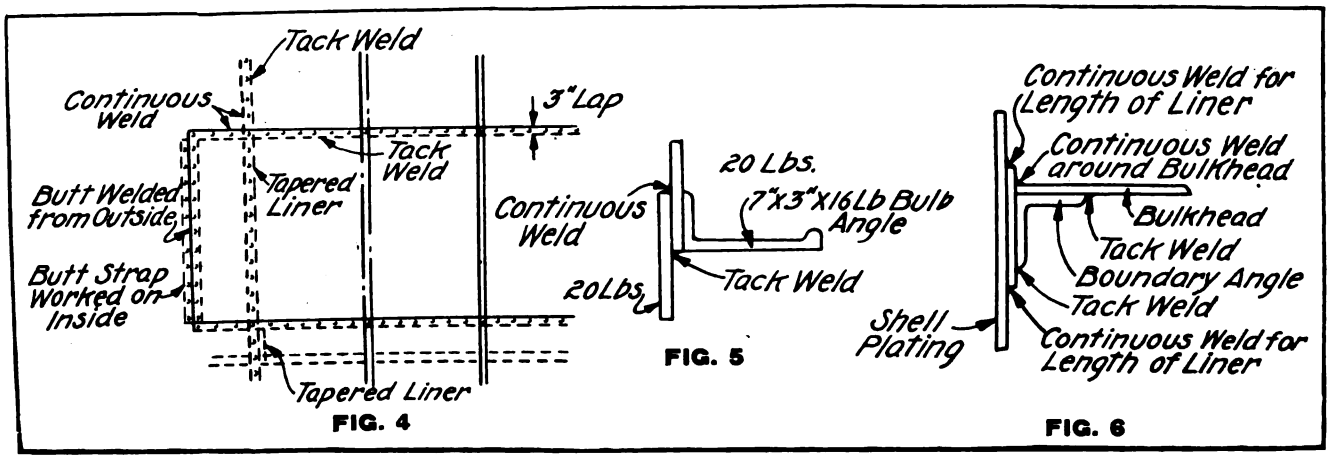

FIG. 4—LAPS AND BUTTS IN THE SHELL PLATING WHEN CONSTRUCTED ON THE CLINKER SYSTEM—FIG. 5—CLINKER SYSTEM SECTION AT CC OF FIG. 2 SHOWING METHOD OF WELDING AT THE LAP OF THE BULKHEAD PLATING—FIG. 6—CLINKER SYSTEM SECTION AT BB OF FIG. 2 SHOWING THE METHOD OF WELDING TAPERED LINERS AT THE LAP OF THE SHELL PLATING

a thin strip over the joint and a satisfactory result obtained. To fit a double strap outside the ship (the practice before electric welding was introduced) would have involved much time and labor and would not have been satisfactory, causing a poor surface and joint.

The reinforcement of badly pitted plates is another of the uses to which electric welding has been applied in ship repair during the present war.

The construction of an electrically welded barge is shown in Fig. 1. The details of this vessel are similar to those of a riveted ship. The plates were bolted up when the parts were assembled, and after welding the bolts were removed and replaced by plugs which were welded up flush with the plating.

The plates, etc., are comparatively light and easy to weld, the only difficulty in the thin plates being that the plate may be grooved along the weld if the operator is not careful.

The type of joint used in this construction was chosen with the purpose of making as much as possible of the welding horizontal, so as to render good work more easily obtainable.

We now come to two of the most interesting applications of electric welding to ship construction so far attempted in Great Britain which consist of experiments designed to show the relative merits of welded and riveted ship construction. The two ships, sections of which are shown in Figs. 2 and 3, had a portion of the side plating—on one side of each vessel only—electrically welded. The other side of each ship was riveted in the usual manner. In one case, as shown in Figs. 4, 5, 6, and 7, the plating was worked on the clinker system; in the other, as shown in Figs. 8, 9, 10, and 11, on the raised and sunken system. Ordinary ship construction was followed in both cases, and although the sketches do not show the most curved portion, the curvature of the shell is evident. The shape of the shell and the restricted space between it and the longitudinal bulkhead rendered the work extremely difficult, and under more straightforward conditions better results should be obtained if proper care is exercised.

Referring first to the clinker system, it will be noted from Fig. 2 that the joint of the lapped edge is horizontal and made in the open by a continuous weld. Rivets with nonwatertight spacing were worked and an intermittent weld applied to the lower edge. If well made, such a joint is quite as good and almost as cheap as a double-riveted lap. The joints of the bulkhead plates are made similarly. Attention is called to the bulb stiffeners at *CC* and to the joints at *BB* and *AA* as illustrative of the difficulties that arise in actual ship construction such as this.

In Fig. 4 the butts of the shell plating are indicated. The joints are between frames and the strap, which is 5⅜ inches wide, is worked on the inside, connected by rivets with nonwatertight spacing, and the butt welded from the outside. Such a joint, if well made, is quite as strong as a double-riveted single-butt strap, is slightly cheaper, and remains watertight at greater loads—an important point often overlooked.

Fig. 5 shows a section through the bulkhead lap. It is of interest, as it

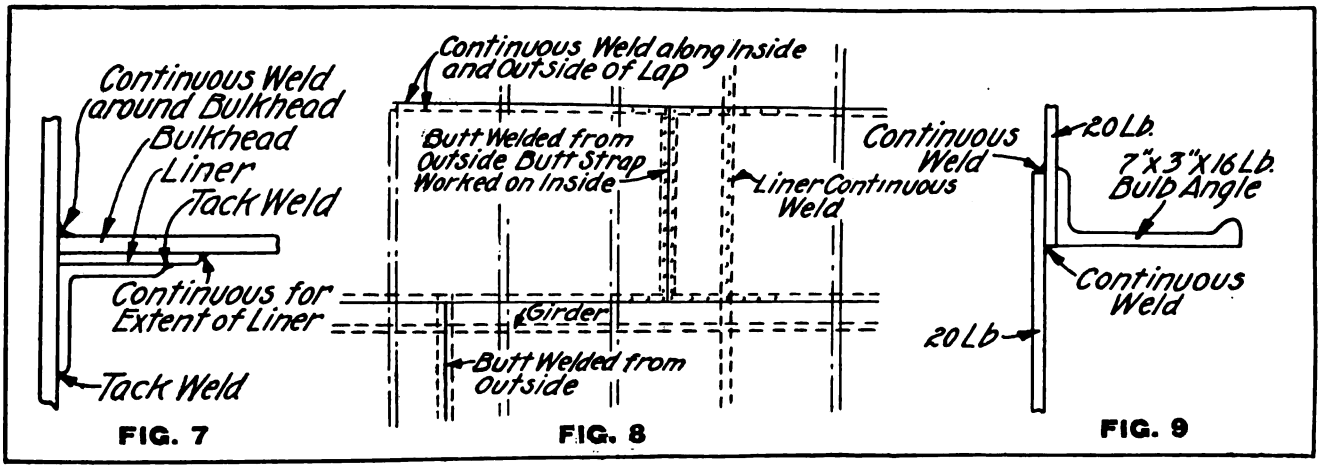

FIG. 7—CLINKER SYSTEM AT SECTION AA OF FIG. 2 SHOWING THE METHOD OF WELDING THE TAPERED LINERS AT THE BULKHEAD LAP—FIG. 8—RAISED AND SUNKEN SYSTEM EXPANSION OF SHELL PLATING SHOWING LAPS AND BUTTS—FIG. 9—RAISED AND SUNKEN SYSTEM AND CONTINUOUS WELDS AT SECTION CC OF FIG. 2 SHOWING METHOD OF WELDING AT THE LAP OF THE BULKHEAD PLATING

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somewhat resembles a shell plate joint at a frame.

The additional welded work necessary where a tapered liner is fitted in order that the bulkhead angle may pass fairly from one strake of shell plating to the other is shown in Fig. 6. Similar work is shown in Fig. 7, where the bulkhead angle passes from one strake of bulkhead plating to another. While in these cases there is considerable difficult welding, such work is less likely to give trouble by leakage than ordinary riveted and caulked liners and joints. In this illustration it may be noted that in the connection of the bulkhead to the shell the boundary bar is fastened by rivets with nonwatertight spacing, a continuous weld being worked along the keel and intermittent welds at the toes of the bar at the bulkhead and shell plating. This is an interesting comparison with American

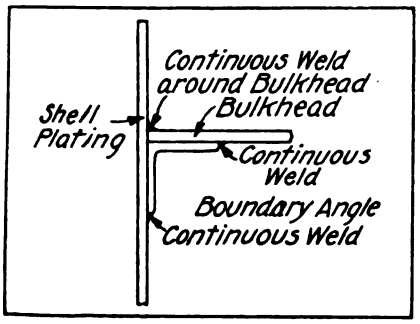

FIG. 10—RAISED AND SUNKEN SYSTEM AND CONTINUOUS WELDS—THIS ILLUSTRATION SHOWS THE METHOD USED IN WELDING BULKHEADS TO THE SHELL PLATING

ideas in regard to right-angle connections. Incidentally, it may be added that the ordinary frames are riveted to the shell.

The Raised and Sunken System

The remaining illustrations show similar work on the second ship, plated on the raised and sunken system. In Fig. 3 it is shown that in addition to this difference, the bulkhead boundary bar has a continuous weld at the toe, both at the shell and the bulkhead. This work was done for comparison, but it is hoped that experience on service will show such extra work unnecessary.

Fig. 8 shows the riveted edges and butts. There is a continuous weld on the outside and inside of the laps, whereas in the other ship, shown in Fig. 4, there was an intermittent weld on the inside. Further, on account of the strake being a raised one, the liner extends the whole width instead of tapering, so that additional welding is involved.

Fig. 9 shows the welding at a lap of bulkhead plating, and is similar to the work on the clinker system ship, illustrated in detail in Fig. 5.

Fig. 10 shows the bulkhead boundary bar, with its three continuous welds instead of one continuous weld at the heel and two intermittent welds at the toes, as shown in Fig. 7.

Fig. 11 shows the considerable welding where the boundary bar passes over the lap of the bulkhead plating and a raised strake of shell plating, necessitating two sets of liners.

Summary of Results Obtained

The following interesting experience has been obtained from this work:

In the case of the clinker system, where there was no overhead work on the outside of the ship, the plating was practically watertight on the first test; but in the other ship, on water-testing, the laps which had been overhead-welded on the outside leaked, and difficulty was experienced in overcoming the leaks. In the case of slight leaks being discovered under test in compartments which have been caulked in the usual manner, the defects can generally be made good while the water remains in the compartment. In the case of welded work, however, it has been found that the presence of water makes welding practically impossible; so that, to remedy leaks by welding, it is necessary to empty the compartment. In the ship on the raised and sunken system the tests occupied a longer time than usual, and it is therefore proposed that with future welded work the tests preliminary to a final water test should be applied by air pressure. This would probably enable leaks to be detected.

On summing up, American and British practice differ in the following interesting points:

American shipbuilders favor spot welding for bracket and such-like connections, while British shipyards prefer riveting.

For right-angle watertight connections the American practice tends to heavy welding, the British to riveted angles, the rivets being widely spaced and backed up by lighter welding, or to notch angles with light intermittent welding.

For butts, notched or riveted straps with widely spaced rivets and one run of heavy welding at the joint are preferred by the British instead of a strap lightly arc-welded to the plates with heavy welding at the joint, which appears the present tendency in America.

For plate edge joints, British practice favors a riveted lap with widely spaced rivets, while the American practice is to dispense with riveting entirely.

Finally, experience in Great Britain shows that at present arc welding should not be applied to mild steel plates of greater thickness than 25 pounds, nor can it yet be used on galvanized or high tensile steel; but the writer has heard of no such limits being imposed in this country.

Marine Railway Supplants Drydock

(*Concluded from Page* 122)

at 9 p. m. the hauling winch commenced to pull on the cradle.

As almost the entire weight of the vessel was still water-borne, the initial inertia was small and was easily overcome. The cradle moved forward up the ways with the vessel gradually settling down until entirely supported. During this operation great care had to be exercised in manipulating the mooring cables at the stern, which was subsequently found to have set-

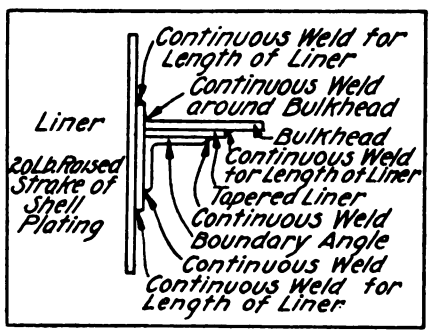

FIG. 11—RAISED AND SUNKEN SYSTEM AND CONTINUOUS WELDS—THIS ILLUSTRATION SHOWS THE METHOD OF WELDING BULKHEADS IN THE WAKE OF THE LINERS

tled within a few inches of the center of the blocks.

The cradle steadily mounted the ways with its huge burden until the entire hull became visible. The total distance of 275 feet was covered in 40 minutes at a mean speed of approximately 7 feet per minute, and the vessel was high and dry in position adjacent to the shops all ready for reconstruction work.

The alterations and reconstruction called for increasing the molded depth by 8 feet, remodeling the stern, new bottom for half the length of the vessel, construction of cargo holds, crew quarters, etc., providing masts, booms, deck winches and all fittings necessary for relaunching completely ready for sea.

Within 75 days of taking possession of the site, the necessary machine shops, carpenter shops, mold loft, stores, offices, etc., had been installed and the vessel brought out of the water.

The operations were carried out under the direction of D. A. Andrus, the company's manager and engineer at Quebec.

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How the Convoy System Operated

A Story Based on Personal Observations at Sea During the War Covering Details Not Heretofore Published

By H. Cole Estep

IF you have a little spare time, look through almost any newspaper file covering the early part of the war and reread the German propaganda stories in which the terrible efficiency of the kaiser's submarines was extolled to the skies and held up before a cringing world as the threat supreme. These stories made a specialty of the statement that the chief terror of the submarine lay in the fact that it was a weapon unseen and invisible, against which no successful defense could be organized. Just contrast this unscrupulous German lie against the troop transportation records of Canada and the United States. Over 2,000,000 American troops were taken across the seas with losses less than occur in ordinary railway traffic in this country. In a large measure, this was due to the fact that a successful defense against the submarine was developed in spite of the wild ravings of Von Tirpitz and his jolly crew of buccaneers. Foremost in the program of defense against the submarines was the convoy system of handling ships in fleets under protected conditions.

System Kept Secret

On account of the strict secrecy observed during the war, only the most meagre facts regarding the convoy system were allowed to be published, and it is only now possible for the first time to present certain facts regarding this exceedingly interesting and tremendously important maritime development.

The convoy system was the result of the experience of the British in transporting troops across the English channel. The British found that by using nets and a screen of destroyers and patrol boats it was possible to fence off a portion of the waters of the English channel from the submarines, with the result that this limited area of the high seas was practically as safe for ordinary navigation as in times of peace. In an intensely practical way this meant that the freedom of the seas was secured within the protected area. In bringing about this condition, the destroyers and patrol boats were by far the most important factors. It was the organization of their efforts, coupled with the invention of the depth bomb, that brought such huge success to the channel operations.

The application of the convoy system to the transportation of troops across the high seas was the invention of Admiral Jellico of the British navy, according to a statement made by our own Admiral Sims in London on Nov. 12, the day after the armistice was signed. The fundamental idea, it is understood, was suggested to Admiral Jellico by the operations on the British channel. Learning the success of this work he conceived the idea of using destroyer screens to form moving parallelograms of free water in any part of the ocean. By keeping the fleet of convoyed merchant vessels within the boundaries of these artificially created parallelograms as they moved across the sea, protected by the destroyers, their safety was assured to all practical purposes. As long as the destroyer screen was effective, the parallelograms marked out by the convoys were to all intents and purposes as harmless as a harbor enclosed by a strong net, or boom. Thus by making small moving sections of the ocean safe, the freedom of the seas and of navigation was assured against vigorous attacks of the disciples of *"Der Tag."*

The Liner She's a Lady

THE liner she's a lady, 'an she never looks nor 'eeds—
The Man-o'-War's 'er 'usband, 'an 'e gives 'er all she needs;
But, oh, the little cargo-boats, that sail the wet seas roun',
They're just the same as you an' me a-plyin' up an' down!

The liner she's a lady by the paint upon 'er face,
An' if she meets an accident they call it sore disgrace:
The Man-o'-War's 'er 'usband, and 'e's always 'andy by,
But, oh, the little cargo-boats! they've got to load or die.

The liner she's a lady, and if a war should come,
The Man-o'-War's 'er 'usband, and 'e'd bid 'er stay at home;
But, oh, the little cargo-boats that fill with every tide!
E'd 'ave to up an' fight for them, for they are England's pride.
—*Kipling.*

Zigzagging Meant Safety

The destroyer screens were effective because, owing to the great speed and mobility of these little boats, they were able to make it hot for any submarine which made its presence known. For this purpose the destroyers used gunfire, torpedoes and depth charges. The latter were by far the most effective. In actual practice, the protected parallelogram enclosing a convoy of 15 vessels is about two miles wide and five miles long. To an ordinary observer, even with four destroyers on a side and one at each end, there appear to be plenty of wide gaps in the protecting screen, sufficient, it would seem, to torpedo half the convoy. In actual practice, however, it was impossible for the submarine to obtain any such results.

In the first place, every vessel in the convoy pursued its individual zigzag course, which meant that the relative positions of the vessels in the fleet were slightly but constantly changing. The zigzagging is accomplished by changing the course about a point to starboard or port, as the case may be, every five minutes or so. Slight though this zigzagging was, it was confusing to the submarine commander. Therefore, if he did get a shot at any of the ships in a convoy there was a fair chance it would be a miss, and the submarines soon found out that although they were by no means sure of getting the merchant ship, the protecting destroyers who rushed up to the scene with their depth bombs were almost certain to get the submarine. Attacking strong convoys, therefore, was almost the same as courting certain death. As a result submarining became a much less attractive occupation to ambitious young Germans with murderous proclivities than it was during the early stages of the war when the merchant ships were nothing more than helpless sheep led to slaughter. The convoy screen was effective because the submarine which showed itself anywhere in the vicinity was very likely never to report in Wilhelmshaven again.

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Of course, the popular idea that the seas were swarming with submarines was a pronounced misconception. This can readily be demonstrated by dividing the number of submarines surrendered by the Germans in November into the number of square miles in the North Atlantic ocean. When it is realized that only 40 per cent of the total submarine fleet was ever in active operation at one time, it becomes at once apparent that even during the blackest month in the submarine campaign there were vast lonely sea areas as free and undisturbed as when Columbus first set out on his westward voyage. The sea never was swarming with submarines, as the yellow press would have us believe, although Germany did have enough in April, 1917, according to Admiral Sims, to justify her in not building any more. Von Tirpitz, however, reckoned without the depth bomb and the convoy system and never caught up in the race again.

Fleet Control Carefully Planned

The convoy system had another advantage in that it concentrated the operations, the convoyed fleets being veritable submarine magnets. In other words, it became necessary for the submarine to go to the convoy in order to accomplish his nefarious purpose instead of simply lying in wait for single-handed merchantmen at large on the high seas. The convoy system, however, was not as simple as the foregoing outline would indicate. Among other things it was necessary to work out the question of fleet control very carefully.

As the great convoys left the shores of the United States, one after another, they were guided across the ocean from the central operating headquarters in Great Britain in much the same way as a train dispatcher handles the operation of a railroad. The operating headquarters was the focus for endless streams of reports which made it possible to keep tab on the location and movements of practically every submarine operating in the north Atlantic. As these reports were charted and plotted, suitable instructions were sent by wireless to the various convoy commanders who laid their courses accordingly. The whole task was much like a gigantic game of chess or blind-man's-buff.

The problem of the officers in charge of the operating headquarters was to keep the convoys on courses that were clear of submarines. There were certain broadly specified courses. In detail, however, the courses were constantly changed by wireless according to the latest information. For instance, the convoy on which the writer went to Europe during the latter part of the war, turned square about in its tracks one day and retraced its course for three hours. Strange, and apparently senseless, maneuvers of this sort were constantly going on.

As the ships left their moorings around New York, one by one, they dropped down the bay and anchored inside the nets off Coney island. Here the fleet assembled. Sometimes a boat would be held at this anchorage for several days. The average delay was about 24 hours. The ships usually sailed out about sundown in great fleets of from 50 to 60 vessels. These sights, to those who were privileged to witness them, were impressive in the extreme.

Painted ships on a painted ocean, their weird camouflage markings splashing in the golden rays of the American sunset, the great fleets of transports and cargo-carriers set forth. During the night they split up into a number of separate convoys for various destinations, or for the same destination, sailing different routes. The convoys usually included about 15 vessels and an effort was made as far as possible to group ships of approximately equal speed.

The ships lined up, three or four abreast, in column formation about a half a mile apart. This formation was rigidly maintained all the way across. Precise, accurate navigation, especially at night and in a fog, was required, and in spite of the fact that no lights were allowed, the early morning passenger on deck was unable to discover any change whatever, during the night, in the relative positions of the vessels making up the convoy. The maintenance of proper courses and distances during the night was aided by faint blue lights which were carried on the taffrails of some of the vessels in the fleet. These lights were visible only directly astern. When necessary, even these could be switched out.

Use of Lights Prohibited

Absolutely no ordinary navigation lights were used and in no cases were cabin lights allowed to shine out. The storm shutters on every porthole and stateroom window were clamped securely shut from the outside, much to the discomfort of the passengers, mostly soldiers, who, however, seldom grumbled. The doors leading on deck were protected by heavy velvet curtains which formed effectual light locks. Of course no smoking was allowed on deck after sunset, and in fact on most ships, no one except members of the crew, sentries and officers actually on duty, were allowed outside of the cabins after 4 bells or 10 p. m., a necessary precaution. On the American side of the ocean, and for most of the voyage across, a heavy protecting screen of destroyers was unnecessary. Most of the convoys made the trip to within 36 hours of the British coast with only one destroyer and usually one cruiser. The cruiser generally led the procession, taking up a position on the port end of the first line of steamers. The destroyer in this case brought up the rear, on the starboard side of the rear rank. Eastbound and westbound convoys, of course, followed separate routes in order to avoid collisions. An effort also was made by the operating officers to spread the convoys out over the ocean as much as possible so as to make it necessary for the submarines to cover large areas.

Fast Runs Impossible

The speed of the convoys naturally was slow, owing to the long courses taken, the zigzagging and the necessity for keeping together. The latter condition compelled the faster ships to check down to the speed of the slowest boat of the fleet. The so-called fast convoys were from 12 to 14 days enroute; other voyages took as many as 20 days. The turnarounds, therefore, were very slow—unavoidably so—and this increased the already serious shortage of tonnage, with the result that shipping controllers on both sides of the Atlantic sprouted gray hairs rapidly.

On account of heavy seas, fogs, engine trouble or other causes, certain ships in the convoys sometimes became separated from their companions. In such cases, one of the destroyers usually stood by until the fleet was reassembled.

When the so-called danger zone was reached, each convoy joined up with from 8 to 10 destroyers. These little guardians of the merchantmen then stayed with their charges right up to the Liverpool bar or into whatever British or French harbor the fleet might be sailing. The junction between the convoy and the group of protecting destroyers was known as a rendezvous. Sometimes the fleet commander was given orders for a certain rendezvous at a certain time, before he left New York. On other occasions the time and place of rendezvous were communicated to him by wireless during the voyage. The problem was not only to avoid submarines, but to get the ships to the proper rendezvous on time. It was a combat in wits between the operating officers and the submarine commanders. Usually the submarines were on the losing side.

The protecting destroyers formed

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columns on both sides of the convoy with the merchant ships in between. The destroyers kept approximately equal distances apart and stood off on either side from the outermost vessels in the convoy a distance of from half a mile to a mile. Every vessel in the fleet kept a sharp lookout and woe to the submarine which showed its periscope. Almost instantly he found himself in a maelstrom of exploding depth charges.

These depth bombs, which were so effective, were also a British invention, according to Admiral Sims, although improved upon and perfected by the American navy. The sailors called the depth bombs pills or ash-cans. The latter designation is the more descriptive. They are cylindrical, about three feet long and two feet diameter, made of galvanized steel. They are filled with TNT or other high explosives and the detonating device can be set so the depth charge will explode at any predetermined number of feet. When depth charges were first used, they were clumsy and dangerous. At the time the armistice was signed, they were safe, reliable and effective. In the meantime, the firing apparatus had been perfected and the amount of contained explosives increased.

How Depth Bombs Were Used

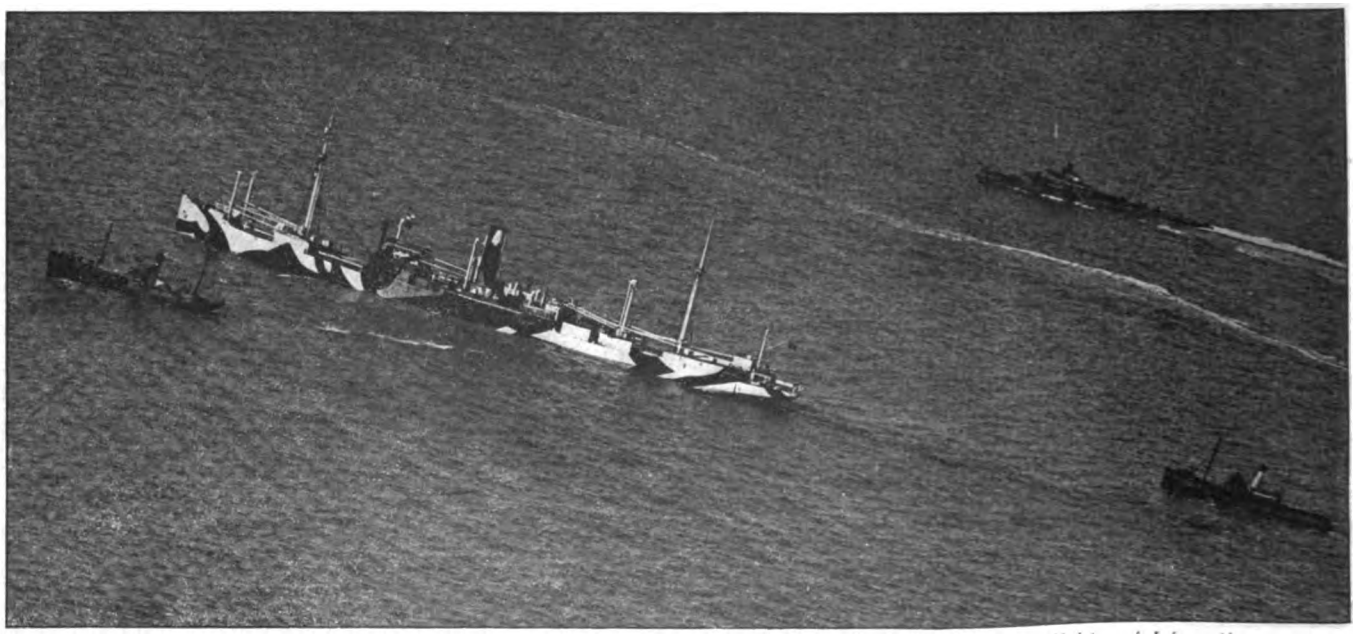
At first each ship carried only a few bombs, but toward the last every destroyer took out 40 or more. Most of them were mounted on skids at the stern, ready to be dropped over the taffrail. It was necessary for the boat from which they were shoved off to get out of the way in a hurry. Some of the destroyers also were provided with double barrelled V-shaped guns. Depth charges were placed in both barrels and fired by an explosive located at the apex of the V. The charges were light and the bombs as they sailed out gracefully could easily be seen. The V-shaped guns made it possible to shoot one charge to port and another to starboard. Depth charge howitzers also were used on some ships.

Sowing mines was a part of the regular job of all the German submarines. Conversely, sweeping them up was a task for the allied navies. Mines were a serious menace, especially for the smaller cargo boats. The big liners with a large number of compartments were fairly immune even if hit. Toward the end of the war, practically every ship on the North Atlantic carried a mine-cutting device known as a paravene. The purpose of the paravene is to cut the mine loose and explode it at a distance from the side of the ship, where it will do relatively no damage. This device is nothing more than a torpedo-shaped buoy about 15 feet long and 1½ feet in diameter, fitted with a rudder at the stern and a towing shackle and cable-cutting knife at the forward end. The cutting knife is a heavy steel plate laid across the nose of the paravene so that it takes on the appearance of a huge flying fish. One paravene is towed from a boom on either side of the bow of the ship on a line like a log, its rudder being set so that it stands out from the side of the ship and keeps the towing line caught. They perform, therefore, the functions of a fender or pre-exploder and are said to be moderately effective is properly used.

The difficulties of the satellites of Von Tirpitz in dealing with the convoys were increased by the elaborate camouflage designs painted on every vessel. Camouflaging is an art rather than a science and, consequently, apparently no two designs were alike. Some of the earlier stunts, such as painting the outlines of small vessels on the sides of larger ships, were found to be ineffective early in the game. Also it soon became evident that it was unnecessary to use elaborate color combinations and toward the end of the war, blacks and whites predominated.

What Camouflaging Does

Ask a man on the street why ships were camouflaged during the war and he will say: "To make them invisible." This was not the purpose of camouflage painting at all. In fact, the camouflaged ships were just as easily seen and just as readily picked out with a glass against the horizon as any ordinary vessel. As soon as any vessel shows her head above the edge of the sea she becomes etched against the sky with startling distinctness, and all the camouflage paint in the world will not help matters much. The real purpose of camouflaging was much more subtle and scientific. It was done to conceal the identity of the ships and to confuse the submarine commander as to their size, speed and course. If the submarine commander was unable to determine whether the ship he was going after was the NARRAGANSETT or the JOHN JONES, his difficulties were appreciably increased, because in such cases he also lacked information regarding the speed of his prey, her maneuver-



Photographs, Courtesy of the British Ministry of Information

HOW A SECTION OF A CONVOY WITH PATROL BOATS IN THE FOREGROUND AND A DESTROYER IN THE DISTANCE LOOKS FROM AN AIRPLANE

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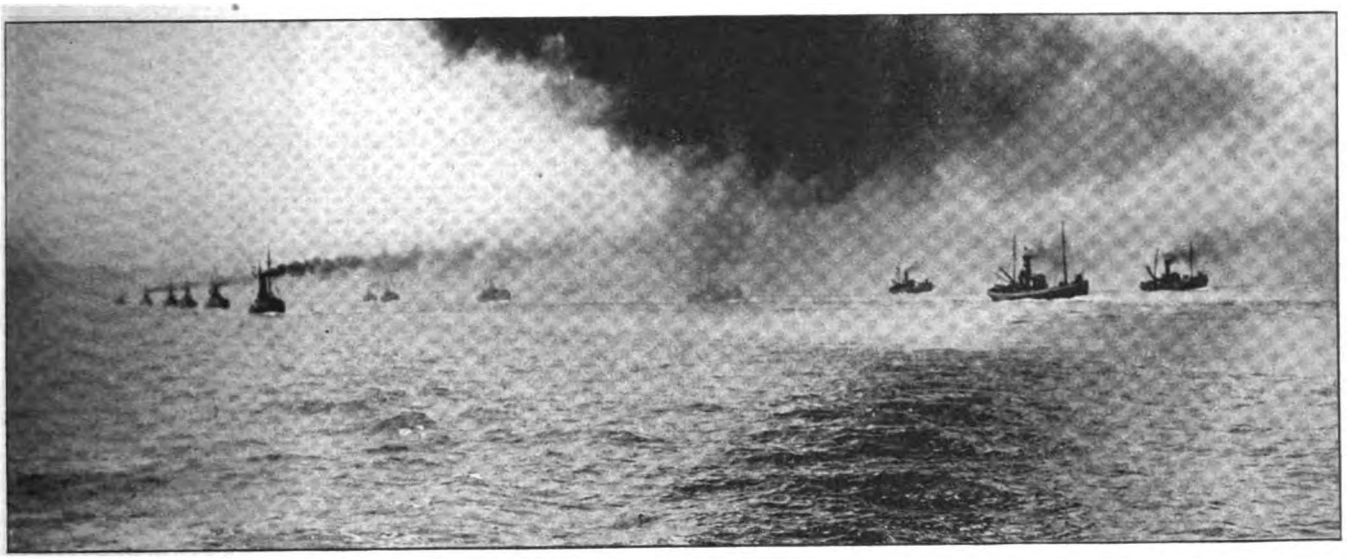

A FLEET OF MINE SWEEPERS AND NET HANDLING CRAFT STEAMING OUT TO SEA FROM A BRITISH PORT DURING THE WAR

ing ability and fighting power. The camouflage designs also were arranged so that it was very difficult to determine just what course a ship under observation was sailing and the speed at which she was going. This, of course, added to the troubles of the submarine and increased the safety of the merchantman.

Miles of Nets Used

During the war, the various harbor and channel entrances were protected by miles and miles of submarine nets. These nets were not made of heavy wire rope as many people imagine, nor were they, as was generally supposed, securely anchored and arranged to catch and hold the submarines. On the contrary, the nets were made of fine wire cables not much over ⅛-inch in diameter. Unusually flexible cables were provided and the nets were made up in sections about 120 feet long and 35 feet wide. The mesh was 12 feet square, big enough to drive an automobile through, with plenty of clearance. The top edge of the nets was supported by ordinary fishermen's floats and the bottom hung with lead weights of the same type. The various sections or units were provided with coupling devices so that continuous nets of any length and depth could be quickly assembled, and as easily disassembled.

The methods of manufacturing these nets were so greatly improved during the war that the cost per section was reduced from about $150 to approximately $30.

The nets were strung out where the submarines were in the habit of operating in much the same manner as gill nets are laid out by salmon fishermen. In fact, the submarine nets were nothing more than enlarged gill nets, the fish in this case being the German pirates. The nets were not anchored, but were attended by drifters or trawlers. The 85-foot and the 110-foot submarine chasers also were used for net patrol work in large numbers. When a submarine came along where a net was located, he poked through the mesh which immediately caught on the conning tower or some other projection. The floats, of course, began promptly to move off at a speed of 8 to 12 knots, while at the same time the net formed a pocket and wrapped itself gracefully around the submarine. The net was so light that usually it did not impede the operations of the submarine in any way and frequently the first intimation the commander of the undersea boat received that his presence was known, came in the form of an accurately placed depth charge which blew him and his craft to kingdom come. It was a very simple matter, of course, for the net patrol boat to drop the charge accurately since the floats indicated the position of the submarine precisely, as well as revealing its course and speed. Sometimes the submarine commander discovered he was in a net and tried to back out. This was not easily accomplished, particularly in view of the fact that the instant he touched the net the disturbance of the floats was noted by the patrol. Thus like the lion in the silken web, many a Hun submarine was brought to an untimely end by a fabric of flimsy wire.

Baltimore Yard's Record

The Baltimore Dry Docks & Ship Building Co., Baltimore, calls attention to the omission of two steamers from the list of vessels credited to this company in the table presented in the February issue showing all American ships delivered during 1918. These steamers are the refrigerator ships NORTH POLE and POLAR STAR. They are 6200 tons deadweight, being sister vessels of the refrigerator ships listed in the table. During 1918, the Baltimore company delivered from its lower plant eight 6200-ton ships from two ways in addition to doing a large amount of government repair work. Two 8800-ton ships were delivered from the company's new yard, making a total of 10 vessels delivered during the year.

Late Marine Patents

Copies of the following patents can be obtained by sending 15 cents in stamps to Siggers & Siggers, National Union Institute building, Washington, by mentioning THE MARINE REVIEW.

1275987—Device for suspending ship's boats from davits; Owen J. McGowan, Brooklyn, N. Y.

1274043—Propelling mechanism, James A. Horne, Denver, Colo., assigned to Edward L. Clover.

1274044—Propelling mechanism, James A. Horne, Denver, Colo.

1274230—Means for raising sunken vessels, Rafael de Arazoza, Habana, Cuba.

1274273—Convertible raft and the like, S. M. Johnson, Cardiff, Wales, assigned to Johnson's Convertible Boats & Rafts, Ltd., Cardiff, Wales.

1274319—Ship propulsion installation—C. A. Parsons, Newcastle-upon-Tyne, R. J. Walker, S. S. Cook and L. M. Douglass, Wallsend, England, assigned to C. A. Parsons, Newcastle-upon-Tyne, England.

1274299—Rudder controlled shield—H. S. McGowan, McGowan, Wash.

1274416—Propulsion device for vessels, Marcus Hollander, Brooklyn, N. Y.

1274550—Davit, Christian Hoer, New York, assigned to Ship Builders Iron Works, New York.

1274624—Submarine net, Joseph A. Steinmetz, Philadelphia.

1274653—Ship protector, John Wosinski, Detroit.

1274694—Bridge for submarines, Harold M. De Graw, New London, Conn., assigned to Electric Boat Co.

1283523—Submarine signal and escape-buoy, Ossed W. Jasper, Columbus, O., assigned to W. M. Jones and M. A. Karshner, Columbus, O.

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Casco Finishes an Eventful Voyage

Captain Kills a Man-Eating Shark and All Hands Toil Incessantly at the Pumps to Keep the Craft Afloat

PSYCHOMETRISTS might well maintain that the old hull of the schooner Casco which Robert Louis Stevenson chartered to cruise the South seas 30 years ago is permeated with the writer's personality. A new chapter in the record of sea thrills and adventure which surround the craft was completed recently when the Casco came into San Francisco with all hands, including the bride of the captain, manning the pumps to keep the water-flush hull from sinking. During the last 44 days of a 65-day voyage from Suva, Capt. Percy E. Troup and his crew of five, including the cook, never left the pumps for a moment. The vessel was making water so fast that an hour without the pumps might have resulted in the sinking of the old craft.

The story of the most recent cruise of the Casco bears many of the "earmarks" of the blithesome, debonair spirit and vivid imagery of the noted writer who maintained open house and open purse at Vailima.

Captain Troup married Miss Flora Goellner of Tacoma, Wash., last Fourth of July. Five days later, he and his bride went aboard the Casco at Astoria, Oreg. They were bound on a trading trip to the same port of the South seas where Stevenson found inspiration. Suva was but a week away when all hands turned to to catch a few fish. Mrs. Troup became entangled in her line when a 9-foot, man-eating shark seized her bait and yanked her overboard.

THERE was a wild whoop from Captain Troup who was standing near the galley. He seized a knife and was overboard with a bound. Swimming desperately, he made for the white, distraught face of his wife who was making valiant efforts to free herself from the entangling line. One moment she was above the surface of the water and the next moment she was beneath it. Troup severed the line that bound her to the threshing shark which had itself become enmeshed. Then he dispatched the struggling monster *a la mode de South seas,* which is just like taking the works out of a dollar alarm clock. The "case" of the fish was pulled aboard the Casco. Twenty of the teeth were removed, cured and, later, at Suva, a jeweler mounted them into a necklace which the bride wears.

On the return voyage to San Francisco, two weeks elapsed before the vessel's seams began to open. Day and night two hands stood at the pumps. Then a terrific gale hit the frail craft. Canvas was carried away—spars began to break—sails had to be handled many times—the pumps stood idle—the water rose.

In this emergency, Mrs. Troup persuaded the cook to help her while the crew "minded ship." For 12 hours the two pumped away while the gale raged through the rigging. When a pilot boarded the schooner off the San Francisco heads all hands were exhausted, but, singularly, when the craft made the harbor, the seams closed up and it was no longer necessary to pump.

The Casco has had a checkered career. After Stevenson surrendered his charter, the vessel went north and became a sealer. Smuggling operations were rumored in connection with the schooner. Later the Canadian government confiscated the vessel for poaching seals and the Casco took her turn at bending "twigs in the way they should grow" while in use as a training ship for the Canadian boy scouts of the sea. The vessel was subsequently sold at auction and she is now owned by H. O. Wicks of Seattle. Recent reports state that she is again to make a voyage to the South seas, but if Captain Troup commands he will cruise alone. Mrs. Troup says she has had quite enough of the Stevenson ship.

AS THE AUTHOR SAYS "IF YOU DON'T BELIEVE IT, LOOK AT THE NECKLACE AROUND THE GIRL'S NECK"

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Lake Carriers Hold Annual Meeting

Vessel Owners and Operators Discuss Shipping Problems Brought About by the Return of Peace—Plan 1919 Operations

OWNERS and operators of the great fleets and vessels plying the lakes, discussed at their annual meeting at Detroit, Jan. 16, methods of preserving in peace times, the efficiency shown under the spur of war pressure. This discussion centered largely around measures for securing a high degree of co-operation between the management and the officers and men on the ships.

This problem of meeting the future with the same high success which characterized the efforts of lake vessel operators during the war, was discussed in a manner which revealed the imprint of the lessons learned during the war.

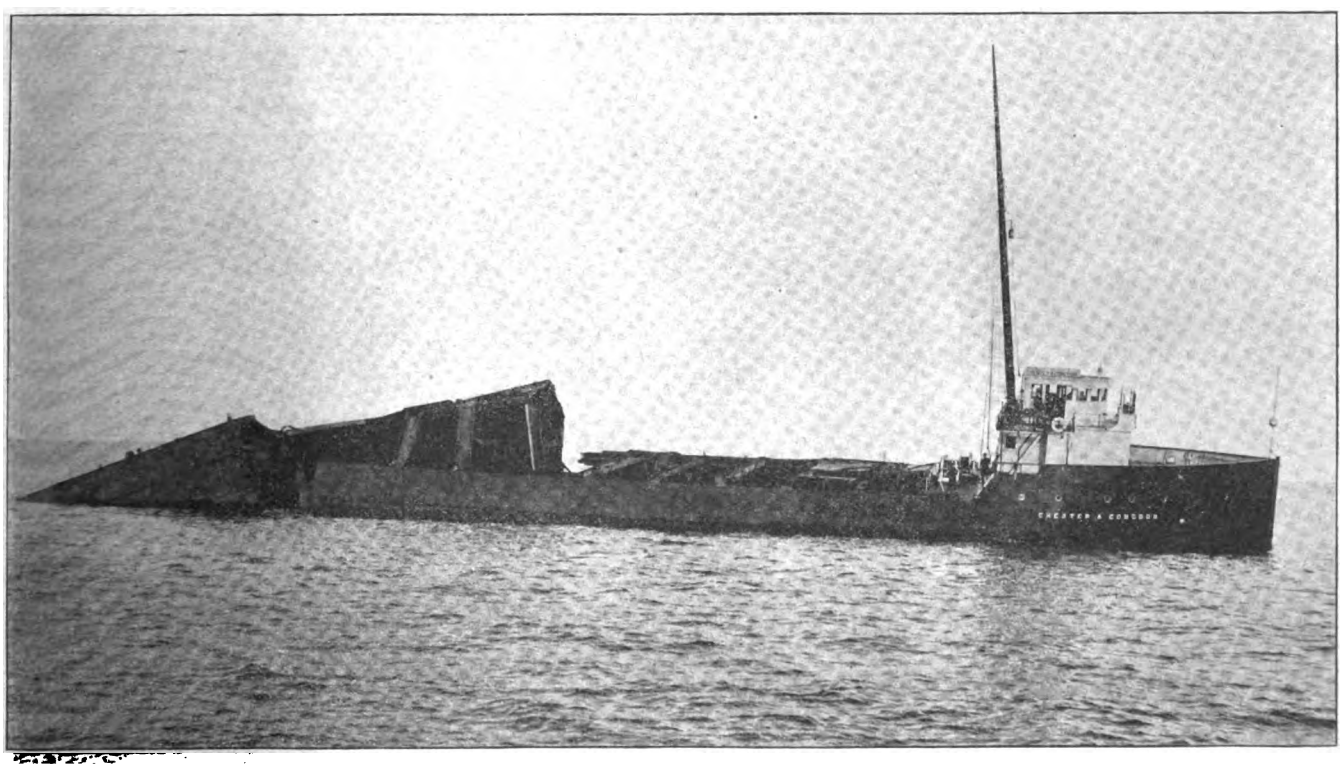
One measure proposed and unanimously approved was to have more frequent conferences between committees appointed by the men from each of the fleets, with the management. At these meetings questions touching operations and conditions on board the ships would be considered in an effort to work out a more satisfactory solution, and thus bring the officers and managers into closer relationship. Committees of masters and assistants may also be asked to confer with the owners and with an industrial committee which would be made up of mates and chief engineers.

These suggestions were discussed at the annual meeting of the Lake Carriers' association held at Detroit, the sessions as usual being well attended. William Livingstone, president of the association, presided over the two sessions. The other officers who assisted him were J. S. Ashley, vice president; Harvey D. Goulder, general counsel, and George A. Marr, secretary-treasurer. Of a total of 19,731 shares represented in the association, 18,055 or 91.5 per cent were represented.

Meet Government Demands

The success with which the vesselmen present at the meeting had met every demand made by the government or by industry during the war period, was hardly discussed although it forms one of the brightest chapters of the industrial history of the war. The report of President Livingstone, which is abstracted liberally on following pages, emphasized, however, the complete success with which every call had been answered.

The great fleet was practically the only important agency of transportation conducted under private management during the war and the record both for 1917 and 1918 is a testimonial to the efficiency with which these private owners met the emergency. President Livingstone gave liberal credit to the efforts of the mobilization committee, a central control organization suggested by and composed of vessel owners. This committee prepared for the 1918 traffic with such foresight that all demands for iron ore, coal and grain were satisfactorily met. The thoroughness of the organization as well as the degree of co-operation extended by all owners is evidenced by the fact that iron ore shipments were out of the way early in November, coal shipments soon afterward, releasing the bulk freighters for handling the late fall grain trade.



BULK FREIGHTER CHESTER A. CONGDON WHICH REPRESENTS THE GREATEST MONETARY AS WELL AS TONNAGE LOSS IN THE HISTORY OF GREAT LAKES SHIPPING

When the Congdon piled up on Canoe Rocks near Passage island, Lake Superior, quite a heavy sea was running. She was steaming about 9 miles an hour and her officers did not hear the Passage island fog signal. Although badly damaged, the vessel could have been released had it not been for the fact that a 55-mile southeast gale whipped up. As a result of the heavy pounding she was subjected to, the vessel broke in two. No plans have been made for salvaging her

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No definite action, however, was taken regarding the handling of lake trade during 1919. It is probable that a meeting will be held before the opening of the season at which the question of conducting the work of the mobilization committee will be considered.

Set Low Accident Record

E. C. Collins, chairman of the welfare committee of the association, and A. W. Thomson, H. K. Oakes and C. J. Peck, members of the committee in charge of its various activities, presented reports showing the progress of the work. Mr. Collins emphasized that during 1918 no deaths had occurred from navigating disasters. The year marked the establishment of the lowest accident rate in the 10 years the plan has been in effect. He pointed out the severe conditions that prevailed last year owing to the inroads made by the transfer of men to the coast and enlistments in the army and navy. Last year 8000 less men were shipped than in 1916. Mr. Collins in discussing the work done under the welfare plan, including those phases which were dropped on the recommendation of the shipping board, pointed out that 161,000 men had put their names on the continuous service record. This was a record of 16,000 men a year, while the average annual needs were about 11,000.

Recommendations were made by the association's industrial committee and by the committee on aids to navigation. These included changes designed to increase safety in navigation, as well as improvements on board the ships operating on the lakes.

William Livingstone was re-elected president of the association. J. A. Ashley was re-elected vice president; Harvey D. Goulder was re-elected general counsel, and George A. Marr was re-elected secretary and elected at the same time to the position of treasurer to succeed the late Capt George P. McKay. A. R. Rumsey was again chosen chief commissioner. Nominations were made by a committee including C. C. Canfield, R. D. Mitchell, G. B. Houseman, H. K. Oakes, J. B. Ayres, J. T. Kelly and W. D. Becker

George A. Marr, C. J. Peck and George H. Warner, all of Cleveland, were elected members of the board of directors. C. D. Dyer, Pittsburgh, was chosen a member of the executive committee succeeding the late Capt. D. Sullivan, Chicago. Capt. W. C. Richardson was chosen to succeed Capt. William Mitchell on the committee. The other members of the committee are William Livingstone, chairman, J. S. Ashley, Harry Coulby, H. S. Wilkinson, G. A. Tomlinson and C. L. Hutchinson.

Discuss Problems of Future

The annual meeting was held on Thursday evening with President Livingstone serving as toastmaster, a number of the members and invited guests giving short talks. In these addresses, as well as in various discussions which developed during the course of the day's sessions, emphasis was repeatedly placed on the newest conceptions of the relations between employers and employes, as well as on the prospects for an American merchant marine.

Board of Directors

J. S. Ashley	*Cleveland*
H. Coulby	*Cleveland*
John Mitchell	*Cleveland*
H. D. Goulder	*Cleveland*
W. C. Richardson	*Cleveland*
W. D. Becker	*Cleveland*
Walton H. McGean	*Cleveland*
A. F. Harvey	*Cleveland*
H. K. Oakes	*Cleveland*
Geo. M. Steinbrenner	*Cleveland*
F. I. Kennedy	*Cleveland*
J. Burton Ayers	*Cleveland*
W. G. Stewart	*Cleveland*
John T. Kelly	*Cleveland*
A. E. R. Schneider	*Cleveland*
C. C. Canfield	*Cleveland*
Chas. O. Jenkins	*Cleveland*
W. M. Williams	*Cleveland*
R. D. Mitchell	*Cleveland*
A. T. Kinney	*Cleveland*
A. W. Thomson	*Cleveland*
W. P. Schaufele	*Cleveland*
C. L. Hutchinson	*Cleveland*
E. C. Collins	*Cleveland*
G. B. Houseman	*Cleveland*
George H. Warner	*Cleveland*
C. J. Peck	*Cleveland*
George A. Marr	*Cleveland*
A. C. Sullivan	*Chicago*
H. F. Hughes	*Chicago*
W. Livingstone	*Detroit*
J. J. Boland	*Buffalo*
J. B. Rodgers	*Buffalo*
G. A. Tomlinson	*Duluth*
D. W. Stocking	*Duluth*
Howard L. Shaw	*Bay City*
H. S. Wilkinson	*Syracuse*
C. D. Dyer	*Pittsburgh*
W. P. Snyder, Jr.	*Pittsburgh*
W. H. Smith	*Montreal*

Report of Protective Association

THE annual meeting of the Great Lakes Protective association held at Detroit, on Friday, Jan. 17, brought out with renewed emphasis, the importance of the work done by this organization in increasing the safety of vessel operations on the lakes. The report of the officers, covering operations for 1918, was as the advisory committee emphasized, a "most unfavorable" one. It served to draw attention forcibly, however, to conditions which formerly were more prevalent but which the association has done much to correct.

J. S. Ashley, chairman of the advisory committee, who presented the report, drew attention to the generally favorable conditions under which vessels operated in 1918. These included the relative absence of the usual severe gales in the autumn months and the general freedom from foggy weather. He ascribed the increase in number and seriousness of the accidents to the anxiety felt on all sides to promote the efficiency of war operation by the movement of maximum tonnages. The removal of the pressure of war demand, coupled with the fact that repairs from now on can be made with greater freedom and probably at reduced costs, encouraged the committee to predict a return to normal conditions. At the same time attention was drawn to the belief that a better result in operation could have been secured during 1918. Members of the association were urged to call the attention of the masters before the opening of the 1919 season to the seriousness of the losses last year and the dangers that result from incautious navigation.

Only 26 out of an estimated total of 189 accidents in 1918 had been adjusted at the time of the meeting, so that an exact figure on the total loss could not be presented. An estimate was made showing a loss of $67,335.51 in operation for the season of 1918. This included a total of contributions from all sources of $405,418.51 offset by expenses, claims paid and estimated, of $472,754.02.

Changes have been made in the provision controlling rates for post season sailings so that such trips now practically are an extension of the navigation season, allowing additional sailings up to Dec. 5 at 0.5

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per cent, to Dec. 9 at 0.75 per cent and to Dec. 12 at 1 per cent. The provisions for sailings between April 1, midnight, and April 15, midnight, prior to the official opening of navigation, remain as in previous years, at pro rata of the daily navigating rate from the time of sailing to April 15, midnight.

No additions were made to the membership during 1918, and while a number of vessels were sold, or taken to the coast, or otherwise disposed of, the membership remains practically the same.

As a result of a suggestion advanced at the meeting, the advisory committee will take under discussion the question of sending reports to each fleet of the results obtained in that fleet. It is hoped by this means to improve operations in those fleets where conditions below the average prevail. The rate question for 1919 was not discussed at the meeting and will be handled as usual by the advisory committee.

Peter Reiss, Sheboygan, Wis., was elected a member of the advisory committee succeeding the late Capt. D. Sullivan. The other members were re-elected, including: J. S. Ashley, A. E. R. Schneider, W. C. Richardson, C. L. Hutchinson, Harry Coulby, C. D. Dyer, H. K. Oakes, John J. Boland, William Livingstone and W. H. Becker. These members later elect officers and the present officials probably will be re-elected. They are J. S. Ashley, chairman; Capt. W. C. Richardson, treasurer; Harvey D. Goulder, counsel, and George A. Marr, secretary and attorney in fact.

The annual report showed that of the accidents of the sailing season, the greatest losses were from strandings in the open lake. The losses from these sources will approximate a half million dollars. There is no question but that the majority of such losses are entirely avoidable and and in practically every case they result from navigating dangerous vicinities in fogs. Strandings in rivers and channels will approximate $200,000. These, also, generally speaking, resulted from navigation in fogs or thick weather. Many times the association has called the attention of everyone interested to the danger and the disastrous result of this practice. It would be far better for the navigator to wait until the weather is clear than to put his ship in dock for a month or more merely to avoid a few minutes' delay.

Groundings in harbors will approximate $200,000; groundings in rivers and channels will be about $125,000. These may be the result, in some cases, of overloading or entering harbors when the water was known to be below normal on account of adverse winds. Generally speaking, water levels were very good during the season; Lake Superior remained practically the same throughout the season, as in 1917; also, there was little change in Lakes Michigan and Huron between 1917 and 1918. In Lake St. Clair, however, the water was considerably lower during the entire year, as also was the water in Lake Erie. It was necessary, therefore, to reduce the drafts in conformity with conditions. We find that the greatest number of groundings in harbors occurred in the lower lakes and in consequence our subscribers should take the precaution to see that their vessels are loaded in conformity with drafts recommended in order to avoid possibility of such losses.

Accident Statement for Years 1909-1918

COMPARATIVE STATEMENT OF ACCIDENTS REPORTED DURING SAILING SEASONS

	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918
Strandings	54	9	14	31	20	18	30	18	23	22
Groundings	128	60	42	30	19	21	28	30	26	44
Collisions	125	88	66	50	52	15	26	31	39	33
Striking obstructions	25	17	8	12	10	2	2	1	8	..
Striking locks	5	1	2	2	1	..	..	..	3	..
Striking bridges, abutments, docks, breakwaters, buildings, piers, buoy lights, canal walls, harbor and channel banks, cribs, etc.	48	40	38	38	30	22	28	35	40	49
Fire damage	3	1	4	..	..	1	1	..	2	1
Explosions	..	1	..	..	..	..	1	..	1	..
Stress of weather	9	2	..	2	4	..	1	2	4	4
Machinery damage	12	1	4	1	3	2	..	3	4	8
Rudder damage	..	4	5	1	1	..	..	..	1	..
Wheel damage	..	4	7	..	..	1	3	8	7	6
Bent and broken quadrants	..	1	2	..	..	..	..	..	..	..
Boiler damage	2	..	..	..	..	1	..	..	..	..
Collapsed decks	2	..	..	..	..	..	..	..	..	..
Cargo heating	1	..	..	..	..	..	..	..	..	..
Legal expenses	2	..	..	..	..	1	..	..	..	..
Lost anchor and chain	1	..	1	..	..	..	..	..	2	3
Ice damage	1	..	..	..	1	..	..	1	52	10
Salvage Association fees	5	..	..	..	..	..	..	..	..	..
Unknown	1	..	..	..	..	..	..	..	..	..
Broken deck winches	..	..	1	..	..	..	..	..	..	..
Loading rig fell on deck	..	..	1	..	..	3	..	..	..	..
Broken quadrant and rudder	..	..	..	1	..	..	..	..	..	..
Cargo shifted	..	..	..	1	..	..	..	..	..	..
Ran over wreck Steamer Joliet	..	..	.	1	..	..	..	..	..	..
Lost shoe and rudder	..	..	..	2	..	..	..	1	..	2
Flooded: Open sea cock	..	..	..	1	..	..	..	..	..	..
Dented plate	..	..	..	1	..	..	..	..	..	..
Twisted rudder stock	..	..	..	1	..	..	..	..	..	..
Gas explosion	..	..	..	1	..	..	..	..	..	..
Personal injuries	..	..	..	..	..	2	..	..	..	..
Mooring damage	..	..	..	..	..	3	..	..	..	1
Damaged lines	..	..	..	..	..	..	..	2	2	..
Broken steering gear	..	..	..	..	..	..	..	..	1	..
Damaged spar	..	..	..	..	..	..	..	..	..	2
Unloading machinery damage	..	..	..	..	..	..	..	..	..	1
Struck unloading rig	..	..	..	..	..	..	..	..	..	3
Total losses	4	6	3	1	9	..	2	1	1	..
Total	428	235	198	177	150	92	122	133	216	189

Certificates written in 1909 on	370	vessels
Certificates written in 1910 on	402	vessels
Certificates written in 1911 on	295	vessels
Certificates written in 1912 on	329	vessels
Certificates written in 1913 on	211	vessels
Certificates written in 1914 on	179	vessels
Certificates written in 1915 on	168	vessels
Certificates written in 1916 on	175	vessels
Certificates written in 1917 on	186	vessels
Certificates written in 1918 on	174	vessels

Collisions in Harbors

Collisions in harbors, of which there were 26, will approximate $70,000. Four collisions in the open lake will approximate a loss of $100,000; nine collisions in rivers and channels will approximate $265,000. These sources of loss have always been the subject of comment in our reports. It is gratifying to know that the number of collisions in the open lake have been greatly reduced, undoubtedly due to the observance of the separate courses, but we still continue to have the annoying minor collisions in harbors which, while generally speaking are not serious, doubtlessly could be avoided by our navigators with very little difficulty. It reflects prominently of "too much rush," "too much hurry," when by taking a little time and precaution this source of loss could be avoided.

Collisions in channels, of which there were nine, are quite serious matters and no doubt to a great extent are attributable to the same causes: "to much rush," "too much hurry," too great a desire to make up a few minutes' time when with a little good judgment and a little caution these accidents could be entirely avoided. We have had 10 losses through damage to vessels in collision with ice. It is quite notice-

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able that out of the 174 vessels that started with the opening of navigation, and all navigated through ice, 10 were damaged. It is quite well proved that these 10 vessels, or the greater proportion at least, were navigated incautiously and with proper care they would have sustained no more damage than the balance of the fleet.

On the 174 vessels in the association we estimate the losses for the year will be approximately $1,750,000, sustained in 189 accidents of all description. The only redeeming feature in the entire situation is that we have gone through the year without a single total loss.

It will be unnecessary to impress upon our subscribers the necessity for immediate and concerted action to correct this situation and we request the co-operation of each member to this end, so that the coming year will be a vindication of the principles for which the association was formed—the elimination of the avoidable accident—and which in this year's operations has been so prominently unsuccessful.

Inside and Outside Courses

The rules regulating traffic up and downbound on both Lakes Superior and Huron as to separate courses have been as effective this year as in previous seasons. There have been no losses in the association by reason of violation of the rule. Too much importance cannot be attached to the careful observance of these courses and we are gratified that our masters are convinced of their practicability and their complete insurance against serious disasters such as occurred prior to their adoption; not overlooking the element of safety which they lend to the navigator in knowing that he will not meet a boat head-on when following these courses, thereby eliminating practically all danger of collision. It is the realization of these things which has obtained such a great success in the elimination of serious accidents and resultant loss of life on these lakes.

Result of 1918 Operations

We have adjusted but 26 claims out of an estimated total of 189 losses. It is, therefore, quite impossible at this time to submit anything like an accurate statement of the outcome of this year's account. We have, however, prepared estimates based on the best information available of the accidents reported during the navigating season, and from this basis is indicated a loss in operation shown in the following statement, computed to the close of the navigating season:

Contributions from all sources, covering the season of 1918 to close of the navigating season, together with interest from depositories, less lay-up and cancelling returns	$405,418.51
Expenses of the association, claims paid and claims estimated	472,754.02
Or, according to present computation there will be a loss in operation to the end of the navigating season of	$67,335.51

Membership and Tonnage

In the annual report for the year 1917 there were 185 vessels then in the membership of the association with gross registered tonnage of 963,033 tons. The following steel vessels were withdrawn from the membership in the fiscal year of 1918:

	Gross tons
Maruba	2,311
E. C. Pope	2,637
Yuma	2,194
Castalia	3,092
Frontenac	2,003
North Pines	2,991
Geo. A. Flagg	3,062
C. W. Kotcher	4,961
R. S. Warner	3,062
Total tonnage	26,313

Also one wooden steamer and one wooden barge have been withdrawn during the year, viz:

Barge Chattanooga	2,339
Steamer Roumania	1,837
Total tonnage	4,176

On account of some of the vessels in the membership being reconstructed and their tonnage changed, it is necessary that we make a deduction of 2050 tons, leaving 174 vessels active in the membership for the fiscal year of 1918, divided as follows:

		Gross tons
165	Steel steamers	908,664
5	Steel barges	13,291
3	Composite steamers	6,067
1	Wooden barge	2,472
174	Total	930,494

The monthly record of accidents, showing the percentage of the whole loss attributable to each month follows:

	—1916—		—1917—		—1918—	
Mo.	No. of accidents	Per cent of whole loss	No. of accidents	Per cent of whole loss	No. of accidents	Per cent of whole loss
Apr.	12	5.87	7	1.32	6	.94
May	20	21.43	72	26.22	47	16.28
June	15	6.65	26	9.83	16	19.36
July	14	17.07	13	7.02	21	7.65
Aug.	15	12.06	15	10.56	29	20.82
Sept.	13	7.31	15	6.36	19	15.72
Oct.	23	13.77	28	17.21	22	7.02
Nov.	18	13.47	33	18.44	24	10.79
Dec.	3	2.37	7	3.04	5	1.42
	133		216		189	

On the 174 vessels active in the membership of the association during the fiscal year of 1918, we have written 174 certificates, valuation aggregating $51,589,500. Of this the association assumed 25 per cent, or $12,897,375.

During the month of July there there was added the rule for navigating St. Mary's river and approved by the United States engineer, that navigation in the vicinity of Pipe island shall be by the use of the right-hand channel; upbound vessels passing to the eastward and downbound vessels to the westward of Pipe island.

Book Review

The Shipbuilding Industry, by Roy W. Kelly and Frederick J. Allen; cloth; 303 pages, 8¼ x 5½ inches; published by the Houghton Mifflin Co. and furnished by THE MARINE REVIEW for $3 net.

War having brought shipbuilding out of the comparative obscurity into which it had been permitted to sink in this country, it is now expected that our increased interest in foreign trade will keep it out. The history of what has already been accomplished by American shipbuilders is, therefore, of considerable interest at this time.

The present volume contains an account of what was effected during the war crisis. The transportation of food, soldiers and munitions to Europe necessitated a large increase in shipbuilding, especially when this need was coupled with the continual decrease in tonnage caused by the submarine. A brief historical resume of American shipbuilding and a brief glance at the origin and history of the various types of ships precedes the description of how ships were built during the recent emergency.

Following the general matter relating to historical development are chapters describing the shipyard itself; its offices, drafting department, foundry, machine shop, and other departments. The work done in each of these is explained. Equipment and its uses, workers and their occupations each are treated in detail. The authors take up steel, wooden and concrete shipbuilding, describing each separately and giving the reasons for the present status of each.

The discussion of the labor question is not confined to a description of work done by the laborer. Labor turnover is discussed and the benefits which can be effected by an efficient service department. The work of the service department includes the management of the employment bureau, hospital, lunch room, etc. Apprenticeship is touched on and the training of workers. Charles M. Schwab is the author of a short introduction prefacing the book proper.

Total trade for December, 1918, at the port of New York, was $314,957,711, as compared with $300,979,033 for the corresponding month in 1917. Gains were made in both foreign and domestic exports. Exports doubled those for the corresponding month of 1917.

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Lake Vessels Meet All Demands

Private Operation of Lake Ships During the War Sets High Record of Efficiency in Handling Huge Tonnage of Freight

By William Livingstone
President, Lake Carriers' Association

THE important part which during the war the members of this association were called upon to take demanded the highest qualification of efficiency and co-ordination. It is known now of what vital importance to the almost famished people of England and France were the successful efforts in bringing down the wheat during those bitterly cold and stormy days of December one year ago; likewise it is known now that the preponderance of American steel was of telling effect in bringing about the preliminary peace.

It is noteworthy that in the accomplishment of these works, as well as in the transportation of all the available commerce of 1918, the service was rendered without semblance of ostentation; hence it is fitting that credit be expressed for a work so patriotically performed. There is, too, just warrant for felicitation over the confidence reposed by the government in endorsing this association's project for mobilizing the fleet as the best means for efficiently handling the commerce of the Great Lakes, whereas the rails, the wires and other shipping were brought under government control. To a very great extent the success of the recently closed season of navigation is due to the mobilization committee, for it was due primarily to the vision displayed by this body in laying the groundwork for the season's traffic, that all the requirements in ore, coal and grain were fulfilled in practically seven months of operation. By its well formulated plans, which left to the separate committees and the vessel owners the protracted labor of working out their application, the mobilization committee made it possible to defer the opening of navigation until such time as the dangers of early sailings ceased to exist, and yet the season's program was so broadly conceived as to insure an ample movement of all lake commodities and warrant a clean-up before the treacherous weather traditional of early December came to hand. If posterity's judgments may be anticipated the real value of the past season's accomplishments does not rest upon what actually was done, but of more vital historical importance is this evidence of what in a crisis can be done on the Great Lakes.

We now face the period of readjustment with confidence and with assurance that in the building up of a world trade and of rehabilitating devastated Europe the members of this association will be imbued with the same spirit of service as when on March 29, 1917, they pledged their earnest and unqualified support to the President and the nation.

At no time during the season of 1918 were water levels favorable for a maximum movement. The highest stage for Lake Erie, as reached in August, was 15¾ inches lower than the high stage of 1917, while the lowest stage of 1917 was higher than the high stage of 1918, and this situation held the vessels closely to the recommended drafts.

Furthermore, the fleet began the season with a loss of 11 ore carriers purchased by the government, representing a carrying capacity of 42,600 gross tons on a single trip, or 852,000 tons for a season of 20 trips. Other sales, and losses from various causes, reduced the fleet during the season by 12 ore carriers representing 56,700 gross tons carrying capacity for a single trip, making a grand total of 99,300 tons of carrying capacity out of commission during more or less of the season.

Despite these combined obstacles, together with the fact that only one ore cargo was delivered in April, the season's movement was 61,156,732 gross tons. In connection with this movement it is signally important to point out that with furnace requirements so nearly provided for at the end of October it was possible to withdraw the barges on Nov. 1 and to divert to the growing grain trade more and more of the steamers as November progressed. The fleet finished the ore season with a required movement of only 4,279,025 tons in November and a single cargo in December, whereas the requirements of the preceding year, although totals were nearly similar, necessitated respective movements of 7,333,828 and 911,475 tons. These features clearly depict the efficiency with which the important ore situation of 1918 was handled.

Notwithstanding that the lake movement of anthracite coal continued after all other upbound commodities had been disposed of, the season's shipments show a falling off in comparison with recent previous years, due to the diversion of anthracite in large quantities to the seaboard. The lake shipments consisted of 3,587,964 net tons from Buffalo, and 360,741

Train Many Seamen

THROUGHOUT the entire season of 1918 *the members of this association gave to the government their unqualified support in training and fitting men for the merchant marine. As a result of the wholehearted co-operation from the managers,* 2925 *naval reservists were trained aboard the bulk freighters during the past season. The effectiveness of the training received was proved by the large number of men who passed the severe examinations necessary to obtain entrance into the officers' school at Pelham Bay.*

During the fall 288 *seamen from the training ship* MISSOURI *and* 35 *seamen from the Joseph G. Branch school of marine engineering, both under the direction of the U. S. shipping board, were placed on vessels in the membership of the Lake Carriers' association.*

The association responded to every call from the Emergency Fleet corporation to provide for the crewing of the ships enroute from the lakes to the seaboard. In this feature alone the offices of the Lake Carriers' association furnished to the shipping board 1934 *men for* 112 *vessels. A summary of the men so furnished follows: First mates,* 2*; second mates,* 1*; boatswains,* 5*; wheelsmen,* 193*; watchmen,* 50*; deck hands,* 304*; able seamen,* 102*; quartermasters,* 1*; engineers,* 1*; third engineers,* 1*; fourth engineers,* 2*; oilers,* 128*; firemen,* 523*; coal passers,* 278*; stewards,* 50*; second cooks,* 46*; porters,* 244*; cabin boys,* 3*; total,* 1934.

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tons from Erie, Pa., making a total movement for the year of 3,948,705 net tons. This is a loss of 741,288 tons from the season's shipments of 1917, and of 475,095 from the total shipments of 1916. Bituminous coal shipments during the past year were so far in excess of recent preceding years that the combined coal movement went beyond 32,000,000, and was, indeed, the second largest coal movement on record.

The grain shipments, as practically covered by the fall movement, totaled 6,548,680 net tons. Therefore, the season's movement in ore, coal and grain reached 107,146,242 net tons as against 108,351,598 net tons in 1917. While these figures show a loss of 1,205,357 tons the observer should not lose sight of the fact that the navigating season was of but little more than seven months' duration.

The fleet brought down 167,717,891 bushels of wheat and 77,585,063 bushels of other grain, making a movement of 6,548,680 net tons. As this was almost entirely covered in the fall movement, and to a great extent during the last six weeks of the season, it undoubtedly was the best on record.

New Industry Grows

The stone industry on the Great Lakes has grown to large proportions. This traffic, handled almost exclusively by the vessels in the membership of this association, totaled 7,467,776 net tons, during the past year. The gross tonnage of this commodity was 6,667,658 tons, and it is interesting to point out that while this trade is regarded as being in its infancy, the gross tons shipped last year exceeded the ore movement of any year up to 1889.

As previously stated, the exigencies of the government required that 12 steel steamers be taken from our membership, hence the association will begin the season of 1919 with a loss so far as number of vessels is concerned. Inasmuch as the vessels taken, excepting the CHARLES R. VAN HISE of 5117 tons, were of the smaller types, the material loss is not so great as the figures would indicate. Sales from our membership to Atlantic coast interests were light in comparison with the 24 months previous. Through shipwreck, however, there occurred the serious loss, from the point of tonnage, of the steamer CHESTER A. CONGDON; also there is to be recorded the minor loss of the barge SANTIAGO. But, as was stated one year ago, the broad constructive program as laid down in 1917 resulted in such extensive additions to the membership in 1918 that there actually is a gain as compared with the gross tonnage existing at the period when government and other purchases for ocean account became evident. In view of the great losses sustained in other channels of industry as a direct result of the war, the present situation of the association is very satisfactory. Additions to the membership in 1918 included the 600-foot steel steamer AUGUST ZIESING, of 8271 gross tons, and the 440-foot steel oil carrier WILLIAM P. COWAN, of 5429 gross tons.

The present membership represents a total of 2,049,105 gross tons, as against 2,013,962 gross tons before the United States went into the war in 1917. It should be needless, therefore, to place emphasis on the fact that our vessel capacity is adequate for any burden that may be imposed.

With supreme gratification it is stated that during the season of 1918 not a single life was lost through shipwreck of a ship in the membership of the Lake Carriers' association, and this record may be broadened by the statement that for two consecutive years no lives have been sacrificed through the shipwreck of a Lake Carriers' steamer.

Well in advance of the fixed time for the opening of navigation the mobilization committee was in possession of the approximate figures of what the season's requirements for ore and coal would measure up to and having with exacting thoroughness worked out a plan to cover the season's movement of the fleet that would handle the situation with satisfaction to all concerned and yet dispense with the risk attendant upon sailings during the very early and extremely late periods of the season, no undue haste was exercised in getting the ships under way while heavy ice prevailed in the lakes and rivers.

Advance Ore Rates

The ever-increasing charges for operation necessitated a further advance on contract ore rates, hence the previously existing rates to Lake Erie, as established Nov. 16, 1916, were advanced 10 cents all around, thus making the carrying rate $1.10 a ton free from the head of Lake Superior, $1 from Marquette, 85 cents from Escanaba, and 70 cents from Escanaba to the foot of Lake Michigan. These prices were the highest that have obtained since 1892, but signify little or no advance in view of the abnormal conditions prevailing last year.

The season's ore movement dates from April 25, when the steamer G. A. TOMLINSON cleared from Duluth with the first cargo from the head of the lakes. She reached the Sault on April 27 and arrived at Buffalo on May 1. On the same day the steamers E. Y. TOWNSEND and J. LEONARD REPLOGLE arrived at Cleveland and the GRIFFIN at Fairport, all ore laden. The April movement of ore consisted of 28 cargoes of 235,870 tons, but of these only the steamer J. J. SULLIVAN, arriving at Indiana Harbor on April 30, succeeded in making an April delivery. Although the April lake movement was of less than a week's duration, actual sailing time considered, the volume of business that passed through the Sault showed a marked improvement over the corresponding opening days of 1917. There were 187 vessel passages, and the freight movement consisted of 4,441,647 bushels of wheat, 2,083,029 bushels of other grains, 131,415 gross tons of ore and an upward movement of 88,078 tons of coal. As a result of delays in loading ore and inability to provide coal cargoes at the lower lake ports for all ships available, together with low water levels, the conditions did not reach proportions that were satisfying to the operating committee until the middle of May. When normal conditions materialized the real effect of the mobilization committee's well laid program became apparent.

Set Successive Records

From this point on, owing to the light demand for grain tonnage and the uncertainty as to coal prices at the Northwest, thus permitting the vessels to make light upbound trips the ore movement enjoyed almost unrestricted rein for 90 days. There was added to the movement the impetus accruing from increased drafts and dispatch was excellent. Therefore, the ore tonnage of 9,921,860 tons for the short month was not only above a million tons greater than May but by 281,869 tons the largest June ore movement. The third consecutive month's record was broken when figures for July revealed a movement totaling 10,659,203 tons, the highest monthly attainment in ore tonnage in the history of the Great Lakes trade. This is more ore than was moved in the entire year of 1895 by over 220,000 tons. The movement of tonnage of ore did not pass the 20,000,000 mark until 1901—seven years later. This year the increase is almost three and one-half times over 1901.

The only movement to assume spectacular proportions during the season's business was the grain trade of the fall months. Through the last 30 days it attracted wide attention, for upon a full movement of the

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bountiful crops again depended the well being of our allies, our valiant troops, and perhaps our vanquished foes.

After the first set of sailings from Ft. William and Port Arthur the spring grain trade was negligible, and concerning this particular movement it is worth while to point out that notwithstanding that the available grain at the head of the lakes one year ago last May consisting of 31,408,847 bushels, was light in comparison with preceding years, the grain available this last spring amounted to only about ten millions of bushels, and furthermore that whereas one year ago all tonnages available was under grain charter, the business of the past spring was well handled by the Canadian bottoms after the season had opened.

When navigation opened there were several vessels at Ft. William and Port Arthur which, having gone up in December, 1917, were unable to load owing to the expected grain not having materialized, else were held there because of the sudden setting in of winter on Dec. 9. These ships held 2,691,868 bushels and the light vessels were assured 5½ cents to Buffalo. For boats not previously placed the rate was 4 cents to Buffalo and 3½ cents to Georgian bay ports. During May and June the grain rate maintained steadily at 4 cents, wheat basis, from the Canadian ports and Duluth to Buffalo. The listlessness of the early trade was well reflected by the shipments to Buffalo, since only 38 cargoes consisting of 5,023,427 bushels arrived at that port up to July 15 as against 352 cargoes of 72,754,394 bushels during the same period of 1917.

Faced Huge Demand

But the fall movement was of a different stripe. Early crop reports of both governments presaged the largest crops of many years, 1915 excepted, and as the harvesting progressed the outturn increased, rather than diminished, upon early expectations. This promising aspect extended to the Lake Michigan trade to an even greater degree. A big situation was never more efficiently encountered nor handled with better dispatch than was this grain movement. To anticipate its various phases your association met at Cleveland on July 22 in conference with Julius H. Barnes, president of the Grain corporation of the United States food administration. At this meeting a committee, composed of H. S. Wilkinson and C. L. Hutchinson from the mobilization committee of this association; of James Carey Evans, representing other United States owners; of Dr. J. C. McGill, Francis King, A. E. Matthews and W. J. McCormick, representing Canadian interests, met with Mr. Barnes to fix rates and make tonnage arrangements. The committee's report, as a resolution, follows:

> The Lake Carriers' association, recognizing the obligation imposed on them of furnishing efficient aid to the transportation of the grain crops of the United States and Canada, agree with the Grain corporation and the Canadian representatives as follows:
>
> (1) That Lake Superior shall be served in preference to Lake Michigan and only surplus grain tonnage sent to Lake Michigan.
>
> (2) That Lake Superior wheat will be served in priority to any other grains.
>
> (3) That all tonnage to Duluth-Superior shall be allotted through the Grain corporation office there; all tonnage for Lake Michigan ports through the Grain corporation office at Chicago, and tonnage to Ft. William and Port Arthur under such direction or control or allotment as is acceptable to the Canadian authorities and the Grain corporation.
>
> (4) That all unloading, Canadian and American, at Buffalo shall be directed by the Grain corporation office at Buffalo.
>
> (5) That the Lake Carriers' association will provide tonnage for the grain movement at rates not exceeding basic rates of wheat, Lake Superior to Lake Erie, 4 cents per bushel until Sept. 1, and 4½ cents per bushel thereafter until Nov. 30; and wheat, Lake Michigan to Lake Erie, 3½ cents per bushel until Nov. 30, with alternate and relative rates as follows: To Georgian bay and Goderich, ½ cent under Lake Erie rates; to Port Huron, ¼ cent under Lake Erie rates; to Collingwood, ½ cent under Lake Erie rates, but terms of discharge at Collingwood to be the same as hereafter provided for discharge at Lake Erie side ports; to side ports other than Buffalo and Port Colborne, including Detroit, same rates as Buffalo, but with special agreement as to discharge, allowing two working days free, but thereafter vessel to receive ⅛ cent per bushel additional on the entire cargo for each running eight hours or fraction thereof, until fully discharged; to ports of light draft, vessel to be allowed freight calculated on its Buffalo capacity.
>
> Other grains than wheat to net the vessel the equivalent of wheat cargo.
>
> Freight to American vessels for carriage to Canadian ports shall be paid in funds current in the United States.

To provide rates on grain for the last trip and for the extensive winter storage capacity requested by the government the mobilization committee met at Cleveland with Mr. Barnes again on Oct. 24. There was present also a committee from Buffalo to which had been assigned the details covering winter moorings at that port. The resolution adopted at this meeting follows:

> That the agreed basis of rates, as per resolution of the Lake Carriers' association of July 22, 1918, specifying certain rates effective until Nov. 30, shall be extended and modified as follows:
>
> Lake Michigan rate after Nov. 30 and to Dec. 5 at noon to be advanced 2 cents and to include winter storage in vessels at destination until April 1; and if loaded before Nov. 30 for storage, the rate to be the advanced rate.
>
> Lake Superior rate after Nov. 30 and to Dec. 5 at noon to be advanced 1½ cents and to include winter storage, and if loaded before Nov. 30 for storage, rate to be the advanced rate.
>
> The rate after noon, Dec. 5, to be arranged by negotiation, but

Vessel Losses During 1918

OVERSHADOWING all things concerned in operations of the past year is the gratifying report to be made that not a single life was lost through shipwreck of a Lake Carriers' vessel in 1918. In a season characterized by recurring heavy fogs, the possibilities of collisions were enlarged, and severe gales were encountered on all the lakes traversed by vessels of the Lake Carriers' fleet, but due to the skill and the vigilance exercised by our navigators, the ships returned the men, who manned them, safe to their homes. It is with deep regreat, however, that this happy condition cannot be extended to include all vessels on the lakes. There was a heavy toll in lives as a result of shipwreck of four vessels en route to the Atlantic coast.

From all causes vessel losses on the Great Lakes in 1918 totaled 21 vessels and consisted of one steel bulk freighter, 10 wooden steamers, six barges, the forward end of one steel passenger steamer, the forward end of a steel bulk freighter and two new mine sweepers belonging to the French government.

Losses affecting the ore trade consisted of two vessels with combined carrying capacity on a single trip of 14,600 gross tons, while the coal trade losses consisted of four wooden steamers with combined carrying capacity of 9000 tons of coal on a single trip.

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not lower than the rate ruling to Dec. 5.

The differentials and other conditions as per resolution of July 22 continued.

Looked at from a winter storage point of view the movement was the largest ever undertaken on the Great Lakes. In the main, the vessels reached their destinations, either at Buffalo or in Georgian bay by Dec. 1, although a few ships cleared from the head of the lakes so late as Dec. 12. The movement was characterized by many extremely large cargoes. To what extent the vessel managers of this association went in their efforts to aid our government and its allies in getting the grain down to points adjacent to the seaboard may be found in the fact that every vessel that it was possible to press into the service was diverted from the ore trade, indeed ships that never before had carried a bushel of grain participated in the movement. In view of the number of vessels engaged, and the vast amount of grain transported, it is astonishing that the proceedings were carried to completion with but a single loss—the CHESTER A. CONGDON—and more so when it is considered that at times the vessels encountered severe weather.

On April 10, vessel owners and coal shippers reached an agreement covering base rates on coal for the season of 1918 to fast docks at the leading ports. The rates were about equal to the average carrying charges of 1917 and were as follows: To ports at the head of Lake Superior, 48 cents; to Milwaukee, Sheboygan and Waukegan, 55 cents; to South Chicago and Indiana Harbor, 60 cents; to Chicago and Racine, 65 cents.

Having realized from the outset that difficulty might be encountered in meeting the Northwest's needs if confronted with a repetition of the delays that often interrupted the bituminous coal movements of the preceding year, the well formulated plans for co-ordination between the vessel owners and the coal exchange were placed into action as quickly as safe navigation would permit. Thus it was possible to have 600,000 tons afloat by April 27; moreover with 100 vessels at disposal 860,797 tons of coal constituted the April upbound movement, whereas no ore or grain was carried in the reverse movement at the precise period. The initiative thus displayed foreshadowed a better movement, month for month, than occurred in the preceding season and became clearly defined when the figures for May revealed a movement in excess of 3,000,000 tons despite the usual delays characteristic of May navigation due to ice and weather, together with the inability of the mines to provide cargoes for all available tonnage.

The mines and the railroads were unable to keep pace with the ships throughout the month of June as well, but the prompt handling of all the coal in sight resulted in a movement of 3,363,000 tons and total shipments up to July of more than 7,000,000 tons. This achievement under adverse conditions at once dispelled any apprehension that might have existed as to a possible fuel shortage. But the movement of coal to the loading ports was so little accelerated in the early part of July that on July 24 the United States fuel administration ordered district representatives to expedite shipments from the mines; furthermore directing that lake coal have precedence over all excepting railroad fuel. Under this influence the ships began to demonstrate their capacity for fulfilling all requirements. The first fair opportunity for handling all the coal possible to load developed in August, when the fleet disposed of 4,805,710 tons. In other words, the ships were taking cargoes at the rate of more than 1,000,000 tons a week, and this rate continued through to November.

A notable feature of the coal transportation occurred in October when the fleet took 4,855,069 tons, making the highest record ever attained on the Great Lakes. The season's movement was now 2,870,000 tons ahead of the corresponding period of 1917, and 33,000 tons in excess of the government's schedule. The systematic manner in which the coal situation had been met made it possible for the fleet to turn to the government's urgent demand for grain tonnage.

The movement of soft coal, covering 28,153,317 tons, was so cleanly executed as to excite the warmest admiration from the shippers, who pronounced it 100 per cent, and in connection with its completeness the actual cargo movement in comparison with the schedule of requirements as fixed by the United States fuel administration is appended:

	Government schedule	Monthly shipments
April	1,500,000	860,797
May	2,500,000	3,041,895
June	4,000,000	3,363,566
July	4,500,000	4,039,737
August	4,500,000	4,805,710
September	4,500,000	4,666,545
October	3,500,000	4,855,069
November	2,500,000	2,519,998
December	500,000	.....
	28,000,000	28,153,317

The appended table shows, in net tons, the iron ore, coal and grain movements during the past six years and the stone movement during the past three years; stone has been added to this record of lake commerce for the first time:

Year	Iron ore, gross tons	Coal, net tons	Grain of various kinds, net tons	Stone, net tons	Total, net tons
1913	49,070,478	33,362,379	11,697,160	.....	100,018,464
1914	32,021,897	27,281,228	9,793,850	.....	72,939,603
1915	40,318,804	26,220,000	11,098,815	3,854,106	93,049,981
1916	64,734,198	28,440,483	10,555,975	5,553,927	117,052,686
1917	62,498,901	31,192,613	7,161,716	6,748,801	115,100,399
1918	61,156,732	32,102,022	6,548,680	7,467,776	114,614,018

Size of Lake Fleet

THE additions to and subtractions from the fleet in the past 24 months form some of the most interesting history of the Great Lakes' trade covering a decade. Although the decline from year to year of the number of ships in operation has been steady the increased size of new construction, on the other hand, has served to maintain the carrying capacity against the inroads made upon the fleet. In 1917 there were 22 vessels lost from the fleet through all causes, as against 14 additions, yet in spite of the net loss of eight vessels the new construction brought out a net gain of 80,700 tons of carrying capacity on a single trip. In the year just closed greater losses are recorded, yet the splendid margin recorded, yet the splendid margin of increase as created in 1917 leaves the grand loss a matter of less than 13,000 tons from a carrying capacity point of view.

For the first time in a great many years the number of ships in the fleet falls below 500, caused by the sale of 18 steel steamers and four steel barges and the destruction of the steel steamer CHESTER A. CONGDON; and through the loss to the fleet by destruction of two wooden steamers and one wooden barge.

Combined, these vessels had total carrying capacity of 101,600 tons but with the gain of 80,700 tons from 1917 and the addition to our membership of the bulk oil carrier WILLIAM P. COWAN, of about 8000 gross tons carrying capacity, the total loss is only 12,900 tons. There are now 497 vessels of 3,073,305 gross tons carrying capacity.

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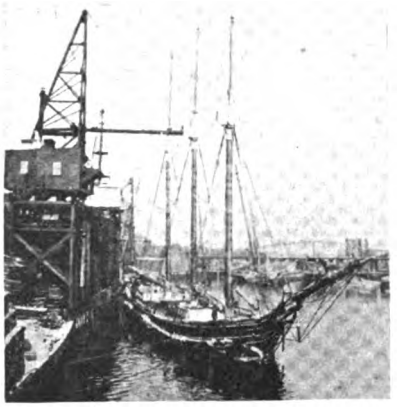
Estelle Phinney, built in 1891 at New London, Conn. This craft is an excellent model of the 4-mast schooner used in the lumber trade a quarter of a century ago

Schooner Gives Way to Steam Collier

By George S. Hudson



William B. Herrick, built in 1874, at Newburyport, Mass. This vessel is a typical, 3-mast, 500-ton, fine-lined schooner, used in the coal trade some 40 years ago

LAKE-BUILT steamships today supply the bulk of the coal for New England's manufactories and homes. The picturesque schooners designed especially for the trade have nearly disappeared from coastwise waters, although a few occasionally put in an appearance from overseas. As a result of the war, the famous fleets owned by the Winslows and the Coastwise Transportation Co. are shattered.

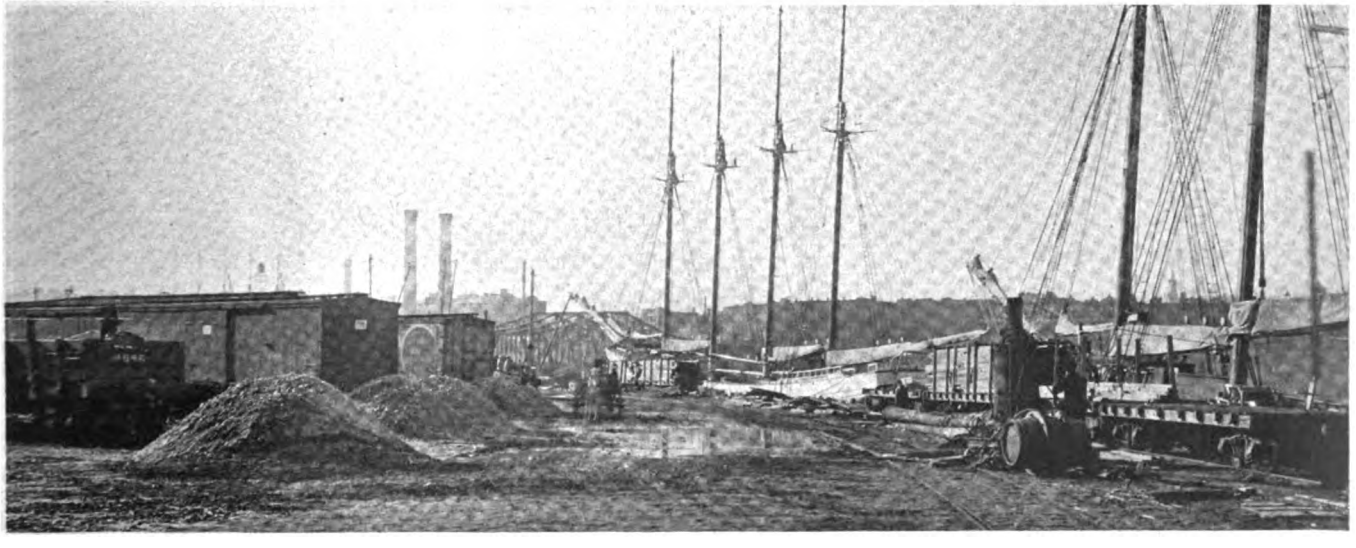
Steamers built at Great Lakes ports now take the place of 5 and 6-masters. Shipping interests remark on the rapidity with which the big schooners disappeared during the past year. Submarines accounted for many while storms destroyed others. Several foundered when nearing destination in France. In one week, four fine schooners were stricken from the list through disaster. There were collisions that resulted disastrously when vessels were running without lights in the war zone. Records show that more than one stately fore-'n'-after, crammed to the hatches with supplies for the allies, was lost without leaving a trace.

With the view of building up the depleted fleet, a number of yards have turned out 4-masters of about 3000 tons deadweight; but there appears to be no inclination to return to the huge craft with five or six masts that formerly moved the bulk of the fuel from Norfolk, Newport News and Baltimore to ports like Boston and Portland, Me. These schooners were good carriers but maintenance costs in these days of high wages and expensive gear might prove prohibitive, even with coastwise charters at the highest figure ever known. It would appear, then, that the day of the sail collier with more than four masts has ended.

The new 4-masters were designed more for capacity than for a turn of speed which was a factor 15 years ago, or before steam began to take the wind out of the coaster's sails. Shoal draft is an item considered in the models with a view to giving the modern schooner a wider range of harbors for distributing points. Hatch arrangement is such that the new vessels fit the more important terminals and, at the same time, the deck plan provides about all that can be desired in handling miscellaneous cargo.

The demand for coal from South America opens a remunerative field for new schooners which load at Norfolk, Va., for ports in Brazil and Argentina at a rate of about $20 to $30 per ton. Returning, these economical windjammers bring wool, hides, pelts and other products which have piled up alarmingly on account of the scarcity of tonnage. The West Indian trade, too, is receiving schooners that, in normal times, would engage in coastwise carrying. With high rates, as at present, vessels should pay for themselves in a few voyages.

There appears to be no difficulty in interesting investors in sail tonnage and the fleet would multiply more rapidly if the yards could find a way to increase output which, already, is surprisingly large.



MODERN LUMBER SCHOONERS AT A BOSTON DOCK—SPEED HAS BEEN SACRIFICED TO CARRYING CAPACITY AS A MEASURE OF MEETING PRESENT-DAY COMPETITION

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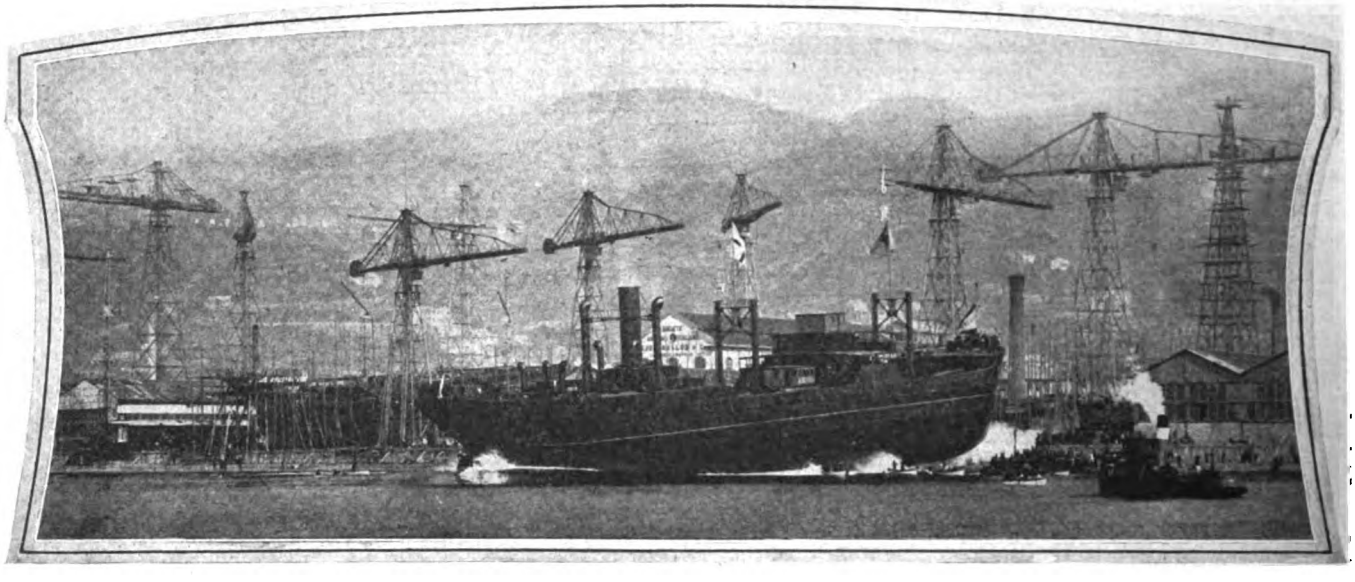
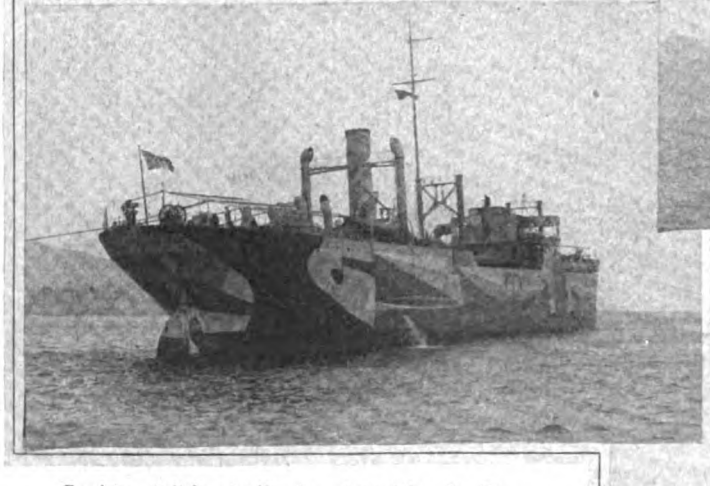
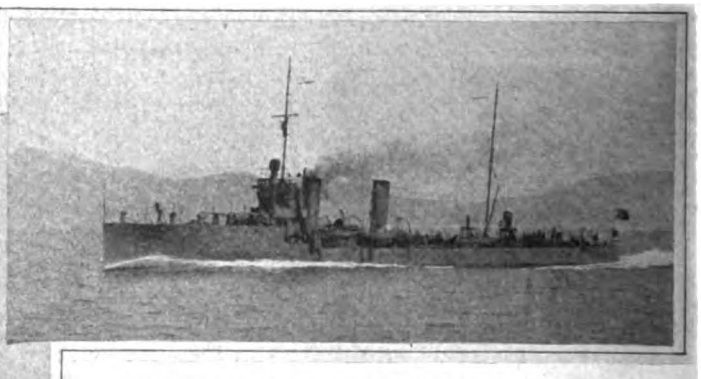
Photographs From Far and Near



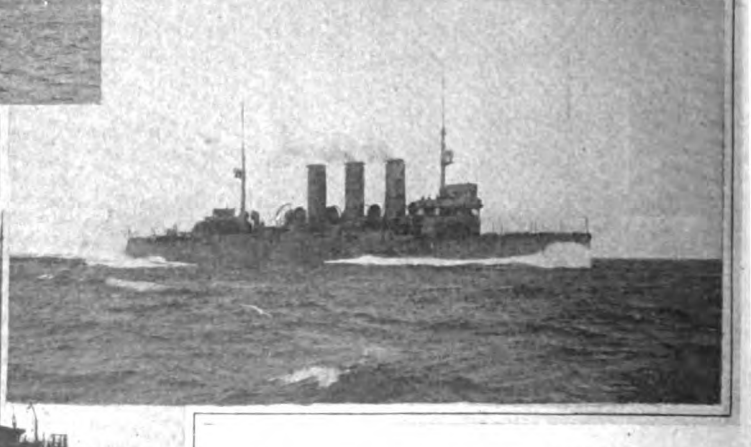
One of the great surprises of the war was the development of engineering in Italy, particularly in maritime channels. Italy, which had not been considered a manufacturing nation, was turning out streams of warships of all types, mostly from the plants of Ansaldo & Co., of Genoa. Here is shown the launching of a standard 8100-ton Ansaldo steamer. The material for all the standard steamers launched during the war was purchased in the United States.

An Italian ship owned by the Societa Nazionale di Navigazione, controlled by Ansaldo & Co., in war paint.

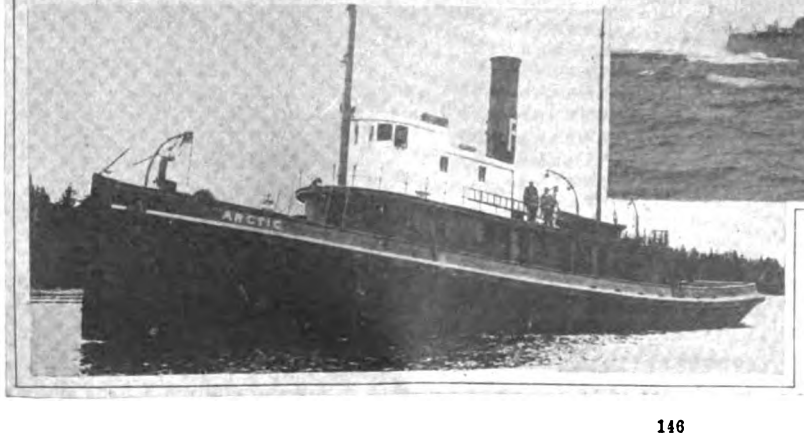




Portuguese Destroyer built by Ansaldo & Co.



Cruiser Libia, built by Ansaldo & Co.



Former Seattle towboat, Arctic, said to be the smallest armored tug doing overseas duty in the United States navy. This diminutive craft has made several voyages to France convoying submarines and submarine chasers

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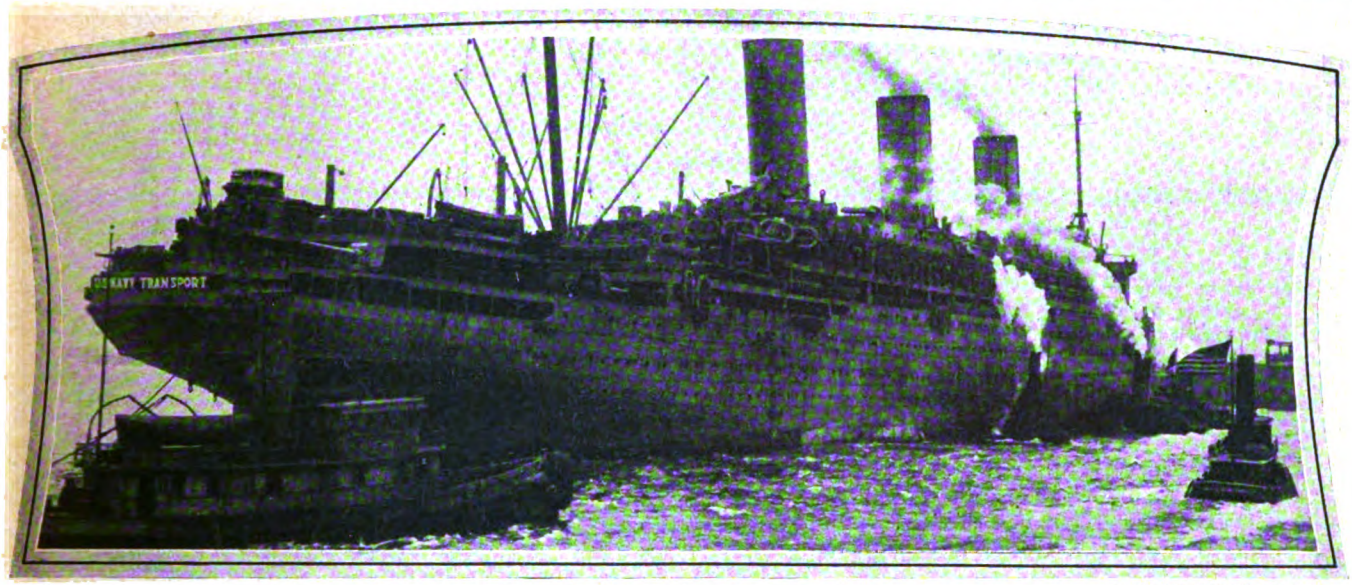
Latest Marine News in Pictures



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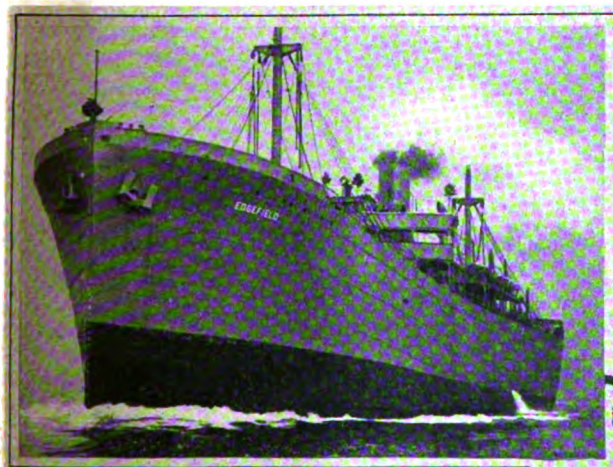
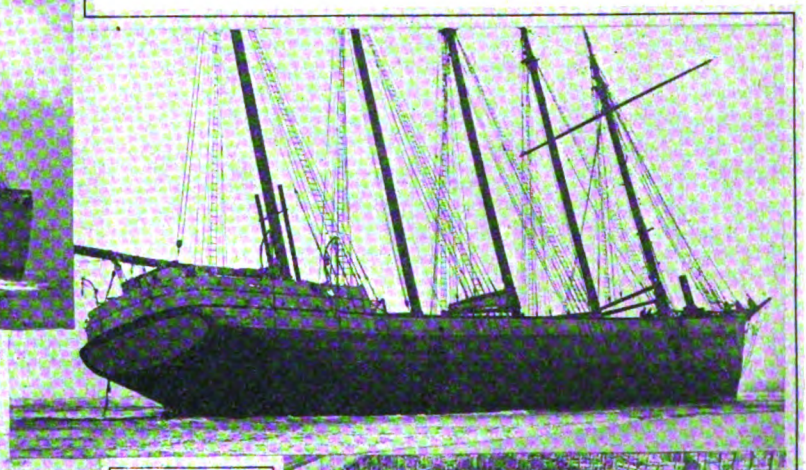
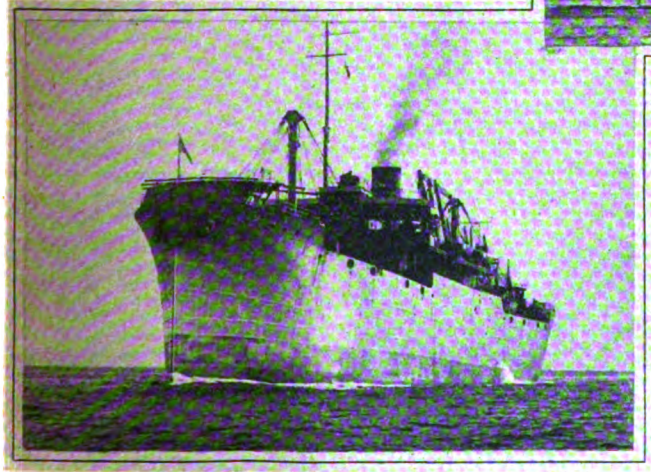
The steamship Leviathan, formerly the German ship, Vaterland, recently arrived in New York with 9000 troops, the largest single quota of veterans to return from France. The men crowded on the decks as the giant ship pulled toward her dock, and a great cheer arose as the city's skyline came into full view. The photograph shows the liner coming up the harbor to her dock at Hoboken.



Str. Edgefield on trial trip, Dec. 31.

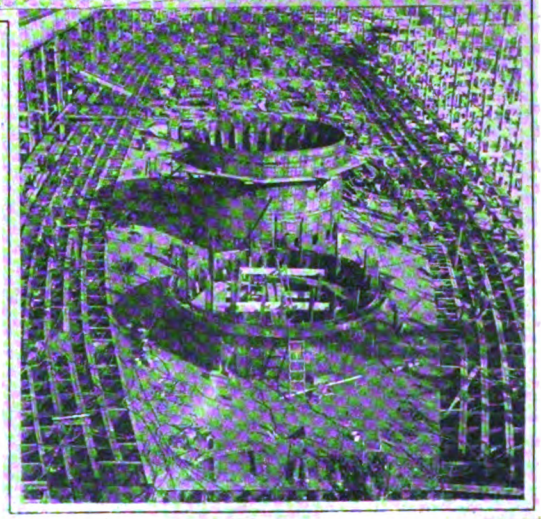
Six men were lost when the five-masted schooner Janet Caruthers, bound from Tacoma to Portland, drifted ashore recently in a heavy snow near the entrance to Gray's harbor.





The Deranof, like the Edgefield, was built by Skinner & Eddy Corp., Seattle. The two ships are now in Pacific trade.

The world's greatest superdreadnaught is being built at Newport News for the United States. She will be 624 feet long of 106-foot beam, and of 46,000 tons. She will be plated with 14-inch armor.



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Late Decisions in Maritime Law

Legal Tips For Ship Owners and Officers

Specially Compiled for The Marine Review

By Harry Bowne Skillman

Attorney at Law

A FERRYBOAT must slow down before entering her slip, and in doing so is not violating the starboard hand rule. The time at which the order to slow should be given is a matter depending upon circumstances, within the discretion of the master.—BRONX, 250 *Federal Reporter* 843.

* * *

The rule in respect to harbor salvage, where assistance is abundant and available, is that awards should be moderate. Failure of active duty laid on salvors in possession of caring for what they have in charge is not sufficient to forfeit award, but it must diminish the recovery, for salvage is not only an award but a reward for successful welldoing.—GEORGE W. ELZEY, 250 *Federal Reporter* 602.

* * *

A lookout's duty, it was said in the case of MADISON, 250 *Federal Reporter* 850, is to report as soon as he sees, not only any vessel with which there is danger of collision, but any which may in any way affect the navigation of his own. He may not himself engage in speculation about the probabilities of collision, or the relative movements of the two. That responsibility rests upon the master alone.

* * *

In cases of collision, the great weight of authority is that interest on damages eventually awarded should be computed from the day of the collision, or from the dates when payments for the necessary repairs were actually made. In collision cases, interest on demurrage should be computed from the time when the vessel returned to service.—In re Great Lakes Dredge & Dock Co., 250 *Federal Reporter* 916.

* * *

Where, when fire on a steamship started, neither of two vessels engaged in salvage service had on hand hose of such size as was required to make efficient use of the other fire-fighting equipment which was on hand, and the fire made considerable headway before such use was obtained, special reward for exercising the foresight and making the outlay required to be ready to fight fires on vessels cannot be claimed.—ROSALIE MAHONEY, 250 *Federal Reporter* 795.

* * *

A stevedore not in the employ of a barge, but of an independent contractor with whom the owner had contracted for her discharge, is considered as being upon the barge at the invitation of the owner, whose duty it was, through its representatives, to see that the barge, insofar as it knew or had reason to anticipate that she would be used by the stevedore in going to and from his work and while at work, was reasonably safe.—Consolidation Coastwise Co. v. Conley, 250 *Federal Reporter* 679.

* * *

The intent of congress in passing act of June 23, 1910, providing that any person furnishing repairs, supplies or other necessities to a vessel shall have a maritime lien on the vessel, and that it shall not be necessary to allege or prove that credit was given to the vessel, was to give a lien for supplies, etc., to the person furnishing the same, upon the vessel to which same was furnished, and a lien arises, though supplies were furnished to a boat in her home port; this lien cannot be displaced by any act of the claimant in advertising and selling the boat subsequent to the time such lien attached.—BUD III, 250 *Federal Reporter* 918.

* * *

In the case of JOSEPH F. CLINTON, 250 *Federal Reporter* 977, it was said that awards of salvage almost always depend for propriety on such a nice adjustment of differing estimates of danger and value that appeals, to merit consideration, must show a yielding to erroneous principle or plain misapprehension of facts. It was further said that a tug is bound by the contract of towage not to abandon both tow and contract when the former gets into trouble, until the reasonable resources of good seamanship are exhausted, that the tug's engagement is usually to take the tow from one place to another in a skillful manner, and when danger arises the tow cannot be abandoned until all reasonable efforts for its preservation have been exhausted.

* * *

The question of attendance fees was discussed in the case of MONKSHAVEN, 250 *Federal Reporter* 1000, where the court said that it is usual for charter parties to provide for the cost of carriage and then allow a rebate from the charge in the guise of a commission to the charterer. The court said also that the presence of a cesser clause is also frequently to be found in them, and that it is further usual, and indeed practically necessary, particularly in foreign ports, that someone familiar with it should look after the ship's business while in port. The person who takes this responsibility is by a custom, which is world-wide, entitled to receive what is in effect a retainer, known as an attendance fee. Expressed in terms of moneys of the United States, this sum is $50. The court called this fee a "retainer," because it is paid, whether the person is called upon to perform any actual service or not. The service which he may be called upon to perform can never, of course, be fully anticipated. In this case it appeared that the charter party provided that agents of the charterer should attend to the ship's business on the customary terms, and it was held that, in view of the custom in such matters, that the representatives, who, as agents, collected demurrage under direction of the ship's master, were entitled to retain a commission of 2½ per cent, the usual amount allowed.

* * *

The word "port" was defined in the case of Hamburg-American Steam Packet Co. v. United States, 250 *Federal Reporter* 747, where the court said: "From what has been said it appears that the word 'port' is a somewhat indefinite term; that its meaning is not exact but depends upon the connection in which it is used; that it has been employed to designate a place where ships are accustomed to load and unload goods, or to take on and let off passengers, and where persons and merchandise are allowed to pass into and out of the realm." The court then further said: "We find nothing in the cases examined which leads us to believe that a place on the high seas, where ships are not accustomed to stop, or to discharge or to take on cargoes, where vessels cannot anchor, and which is not a place of safety for either ship or goods, can be regarded as a port."

* * *

In the case of VANADIS, reported in 250 *Federal Reporter* 1010, it appeared that libelant's pleasure yacht was injured in a collision so that it had to be drydocked for repairs. The point in issue was whether libelant was entitled to damages for detention, in view of the fact that libelant had no intention of chartering the yacht, but intended to use it for his recreation or pleasure. In deciding in favor of libelant, the court said: "On principle it seems to me impossible that we should draw any distinction between yachts and any other property capable of use only as means of recreation or pleasure. Nobody has any hesitation about such as are consumable, like wines, or flowers, or perfumes, or tobacco. It would be a fatuous defense against an action for injuries to such as these to prove that the owner would certainly have consumed them himself. Furthermore, if the defendant had wrongfully destroyed a yacht or motorcar, he would be hardier than most, were he to offer to show that the owner was bound not to sell or to let it."

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National Merchant Marine Association

WITH the hope of promoting the development of an American merchant marine under private control, the National Merchant Marine association was organized as a result of a convention held in Washington on Jan. 23 and 24. Ship operators, shipbuilders and others prominent in the marine affairs of the country, actively participated.

The meeting was called by Senator Joseph Ransdell, of Louisiana. A number of addresses were presented by men prominent in marine affairs. Included among the speakers were: Homer L. Ferguson, president of the Newport News Shipbuilding & Dry Dock Co.; J. W. Powell, vice president, Bethlehem Shipbuilding Corp., and Holden A. Evans, president, Baltimore Dry Docks & Shipbuilding Co; Senator Ransdell, Senator Fletcher, Congressmen Greene and Alexander, Charles Page, of the shipping board; Lewis Nixon; Wallace Downey, president, Downey Shipbuilding Corp., and others.

The following temporary officers were chosen: R. Goodwin Rhett, Charleston, S. C., former president, chamber of commerce of the United States, named as vice president, has since declined to serve owing to press of personal affairs; Winthrop L. Marvin, Boston, was named secretary. A permanent president is to be chosen later.

The association adopted a resolution pointing out its purpose to advocate the establishment and upbuilding of an American merchant marine. A council of not less than 30 members will form the governing body. Representatives of agricultural, commercial and labor interests were recommended for membership upon the council. Admiral F. T. Bowles opposed the organization of the new association, urging the formation of a body representing the government and people.

Senator Ransdell, in sounding the keynote of the convention, pointed out the lack for years past of a definite merchant marine policy. Nine federal bureaus and commissions have more or less to do with shipping, none having any connection with the others, he stated. The questions he recommended for discussion included the advisability of a big merchant marine, its handling as an effective naval reserve, continuance or cancellation of the shipping board's ship construction program, government or private ownership, subsidies, federal bonuses to seamen, government-controlled corporation to operate ships, federal reserve of fuel oil lands, relation of the navy to the merchant marine and the creation of a cabinet member to handle transportation problems.

National Rivers and Harbors Congress.

THE National Rivers and Harbors congress held its fourteenth annual meeting in Washington, Feb. 7. The meeting was attended by delegates from all over the country. This congress is an organization, nation-wide in scope, and its object is to promote the improvement of harbors and interior waterways and to establish and maintain commerce.

In the development of inland waterways it was pointed out that there must exist in the territory contiguous to the navigable waterway, production and a demand for distribution of products in sufficient volume to furnish traffic. Emphasis was also laid on the fact that the railroads and waterways must co-ordinate to secure the best results.

Pacific Coast Steamship Association

FIRST steps in the organization of the Pacific Coast Steamship association, which will include in its membership all of the owners and operators of the steam-propelled vessels on the Pacific coast, were taken in San Francisco, Feb. 4, at the call of H. C. Cantlow, assistant general manager of the Pacific Steamship Co., and E. J. Marion, assistant general manager of Dodwell & Co.

The following lines signified their intention of affiliating with the new association: Hind-Rolph Navigation Co., Union Steamship Line, O. A. Lindvig & Co., Dodwell & Co., Mitsui & Co., Oceanic Steamship Co., China Mail Steamship Co., East Asiatic Co., Ocean Shipping Agencies, Toyo Kisen Kaisha, Matson Navigation Co., W. R. Grace & Co., Swayne & Hoyt, Bank Line Transport & Trading Co., Transoceanic Steamship Co., and Pacific Mail Steamship Co.

National Foreign Trade Council

MERCHANT marine problems will dominate the sixth National Foreign Trade convention to be held in the Congress hotel, Chicago, on April 24, 25 and 26. James A. Farrell, president of the United States Steel Corp., and chairman of the National Foreign Trade council, has just issued the formal call for the convention.

"Foreign Trade Essential to American Industry" will be the theme of the convention.

"The abrupt termination of the war in Europe," says Mr. Farrell, "has brought the United States suddenly face to face with certain questions of grave concern to American foreign trade and industry.

"Now, as never before, the United States must rely upon foreign trade to make certain the full employment of labor and to provide investment for capital; to stabilize industry and prevent disturbance of domestic conditions; to insure the permanent retention and operation of our new merchant vessels under the American flag; to maintain prosperity among American producers and to forestall any retrogression from the high standards that have been achieved.

"To give constructive consideration to the needs of American foreign trade enterprise in this emergency; to assist in devising means and methods that will enable our overseas commerce effectively to meet the conditions which it faces, and to arouse American manufacturers, farmers, merchants, laborers, bankers, educators, railway and steamship men—all the factors of foreign trade in all sections of the country—to the imperative necessity of bending their energies to the prompt solution of these problems, the National Foreign Trade council has called this convention.

"This is a call to action. The opportunity is at hand. A great foreign trade is ours, if only we proceed with energy upon lines of sound policy. A great carrying trade under our own flag is ours, if only we make it possible to operate our new ships in competition with those of other nations."

A special session on the American merchant marine will be held on April 25 to discuss shipbuilding, provision of cargoes, trade routes and return cargoes, inland waterways, U. S. and foreign navigation systems, a maritime policy.

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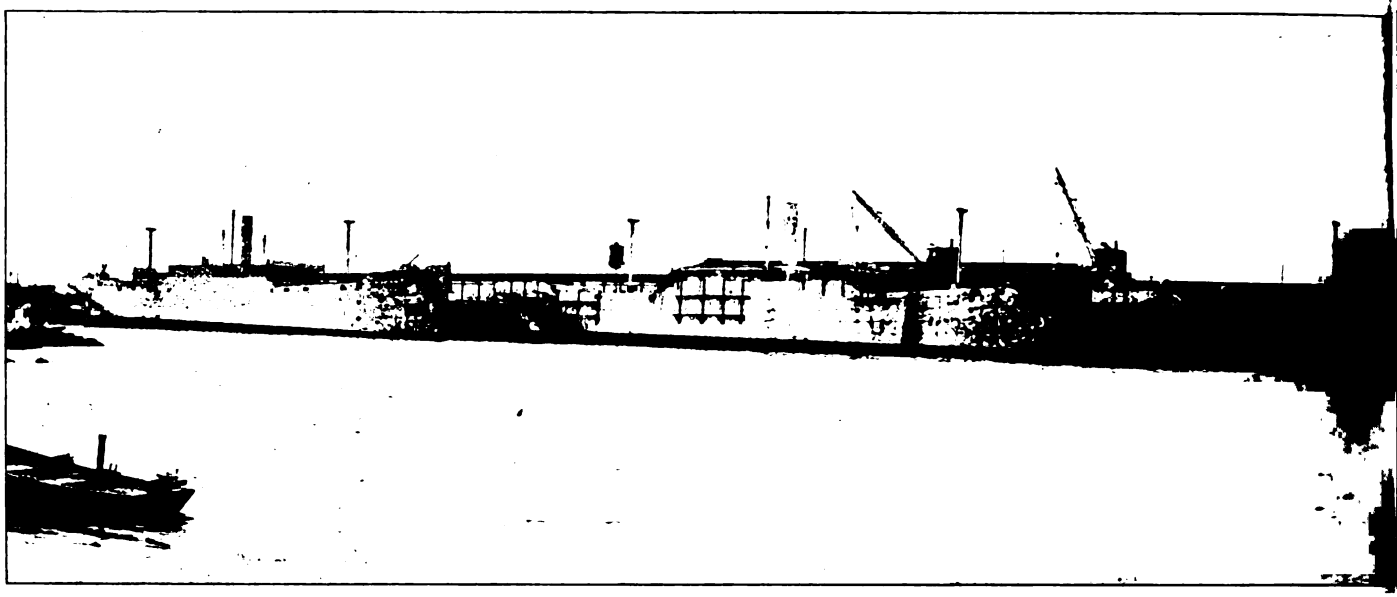

Steel Ships Moored at the Fitting-Out Docks of the Submarine Boat Corp.'s Newark Bay Shipyards are Shown in the Panoramic View Given Above

Fabricating Yards With 90 Ship Ways

WITH 90 ways occupied with fabricated ship construction, the Emergency Fleet corporation is today entering upon a production test of the fabricated vessel under normal conditions. The abnormal year 1918 did not offer a good test of the efficiency of the three large fabricated yards of the government, but they have at last been completed and ship production is now beginning in earnest. Eight fabricated ships have already been delivered, two others have completed their trials and one more was under trial on Feb. 8. To this date, these represented the total completed work from the 50 ways at Hog Island, the 12 ways of the Merchants Shipbuilding Corp. at Bristol, Pa., and the 28 ways of the Submarine Boat Corp. at Newark, N. J.

On Feb. 8, the Hog Island yard had launched 14 hulls and delivered 5 completed ships; the Bristol yard had launched 5 hulls and 2 ships had been accepted by the government; the Newark yard had launched 23 hulls, delivered 1 completed ship, and had 2 others ready for delivery.

All of these ships have received first class rating. Reports that Lloyd's had granted a second class rating to the QUISTCONCK, the first fabricated steamer completed at the Hog Island yard, are not true. The classification society merely withheld the equipment number from the steamer because when she sailed on her maiden voyage she carried a chain cable which had two imperfect links. The managers of the ship considered it so imperative that the vessel get away that they refused to delay her sailing date until another cable could be secured. The QUISTCONCK was rated 100 A-. When the defective cable is replaced to the satisfaction of Lloyd's, the vessel will be rated 100 A-1.

The QUISTCONCK made port at Cristobal, Panama, on Jan. 10, 1919, just seven days after she left Norfolk with a cargo of coal for the canal zone. She touched at Cuba on the trip. Her engines worked perfectly throughout the voyage and she made an average speed

THESE VESSELS AT NEWARK BAY ARE NEAR COMPLETION AND SOON WILL BE READY FOR SERVICE—THEY FORM ANOTHER PART OF THE GROUP

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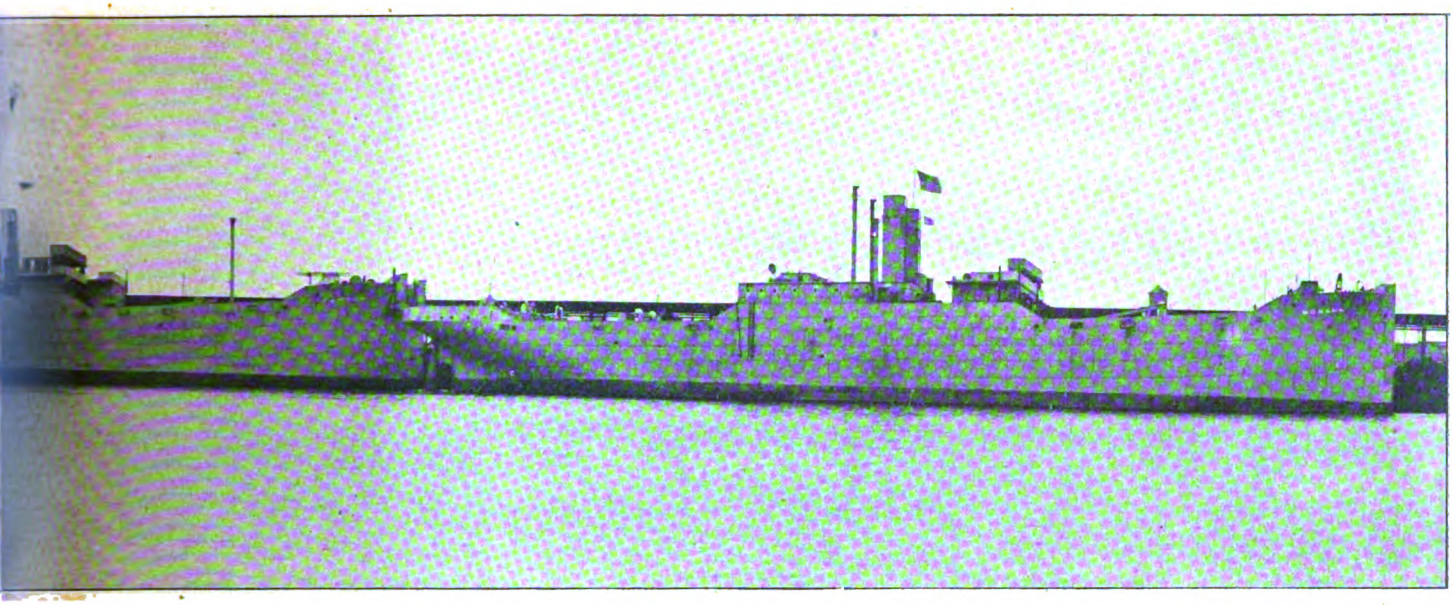

and Below—This Illustration is an Excellent Example of What the Fabricating Yards Expect to do When They Reach Quantity Production

Have Launched 42 Boats, Delivered 8

of 10.9 knots per hour between Cuba and Cristobal. The ship was launched on Aug. 5, being christened by Mrs. Woodrow Wilson. There was considerable delay in the fitting out and delivery of this vessel because a large amount of riveting had to be completed at the fitting out dock.

Today, all 50 ways at Hog Island are occupied. The first vessels built are all 7500 tons deadweight; 39 of the ways are now occupied with this type of ship. The remaining 11 ways are occupied with the construction of vessels which are to be standard 8000 tons deadweight.

The Submarine Boat Corp., from its plant at Newark, has launched 23 fabricated boats up to Feb. 8. All of the ships built at this yard are to be 5500 tons deadweight. Owing to a mishap in the delivery of gears for the turbine engines, however, but one of these vessels had been completed and delivered on this date. This one was the AGAWAM, which had the honor of being the first fabricated vessel launched from any of the government agency yards. Two others, the ALCONA and the ALAMOSA, have completed their trial trips, and 18 of the others are completed and awaiting gears. The first gears furnished for the ships produced at this plant did not prove satisfactory. The illustrations show these ships at the yard.

Several unfounded reports have been circulated about the AGAWAM. Upon investigation it was discovered that trouble encountered on her trial trip was due to an inexperienced fire room crew who did not know how to fire with oil. In December she took aboard a cargo of sugar and sailed for Genoa, Italy. Again the raw crew reported engine trouble and put in at Bermuda. Investigation again showed that there was no mechanical trouble and the vessel was started on her way.

The Newark yard holds the record of manufacturing fabricated boats cheaper than either of the other two fabricating yards. It has been estimated that, figuring in the yard expenses, the boats are costing on an average of $206 per

SHIPS SHOWN IN THE UPPER ILLUSTRATION. THIS YARD HAS LAUNCHED THE GREATEST NUMBER OF SHIPS OF ANY OF THE FABRICATING YARDS

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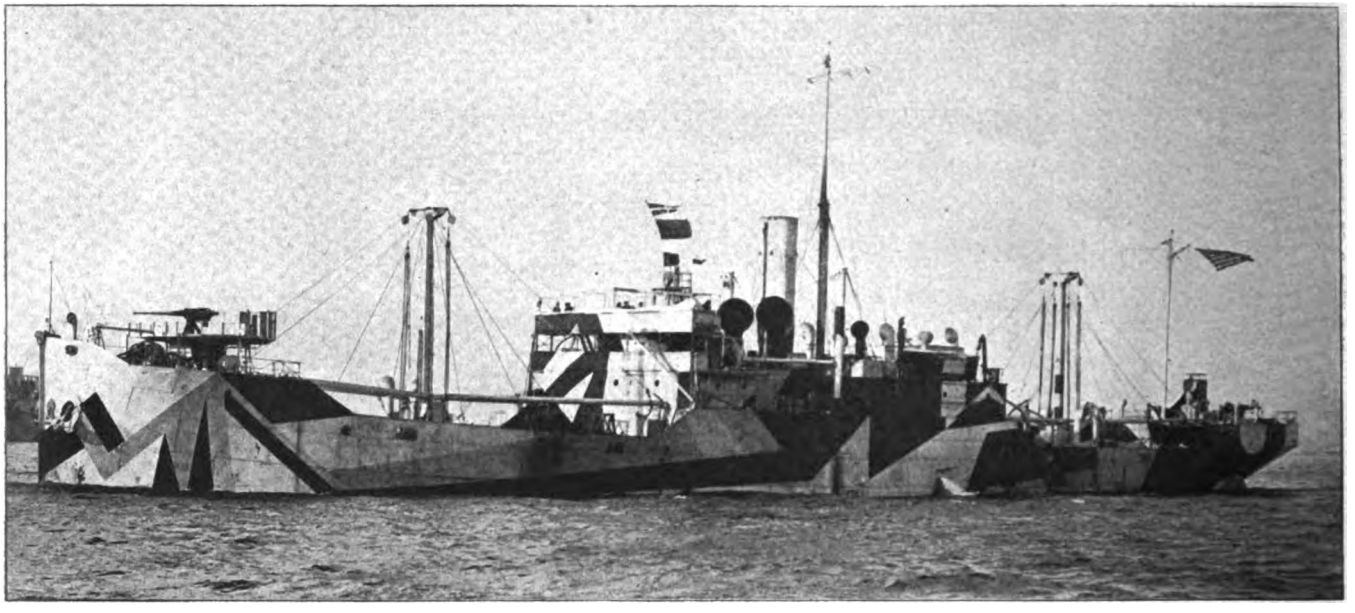
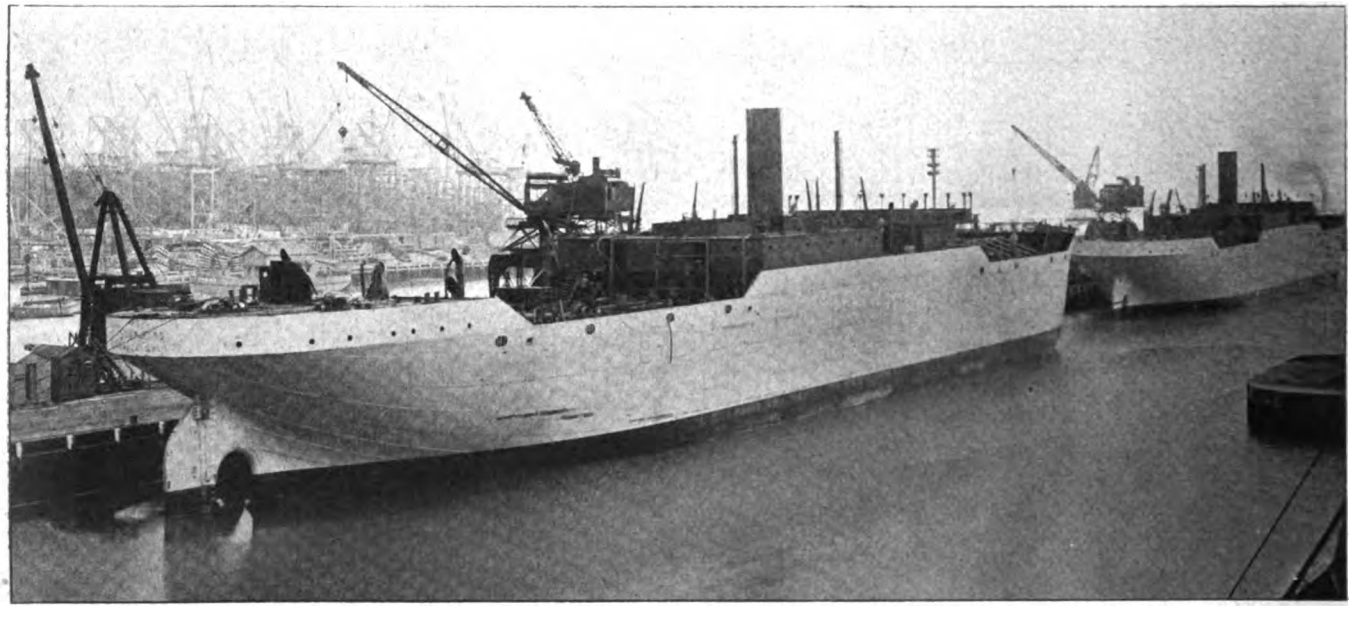
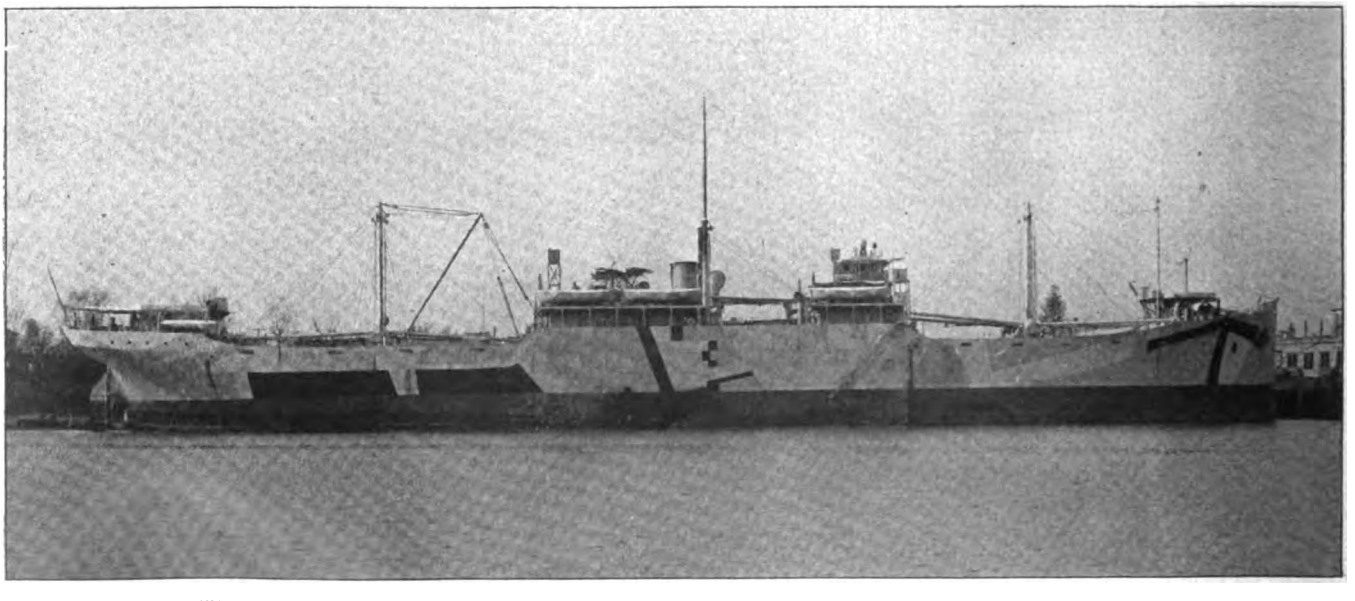


THE AGAWAM READY FOR SEA—FIRST FABRICATED SHIP BUILT BY THE SUBMARINE BOAT CORP. AT ITS NEWARK BAY YARDS



FITTING-OUT DOCKS AT HOG ISLAND—THIS YARD HAS DELIVERED SEVERAL VESSELS, ITS FIRST PRODUCT BEING THE QUISTCONCK



THE WATONWAN READY TO LOAD—FIRST FABRICATED VESSEL BUILT BY THE MERCHANTS SHIPBUILDING CO., HARRIMAN, PA.

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Ships Produced by the Three Fabricated Yards to Feb. 8, 1919

American International Shipbuilding Corp., Hog Island, Pa. Ships 7500 Deadweight Tons

Hull No.—Name	Date launched	Date delivered
492—Quistconck	8- 5-18	12- 3-18
493—Sac City	9-30-18	1- 6-18
494—Sacandaga	10-29-18	1-22-19
495—Saccarappa	8-24-18	12-31-18
496—Saco	12-30-18	.....
497—Sagaporack	12-29-18	.....
498—Sago	12-23-18	.....
499—Saguache	11-22-18	1-29-19
500—Sahale	12-27-18	.....
501—Saluda	12-31-18	.....
503—Sapinero	11-22-18	*
506—Saucon	12-31-18	.....
507—Saugerties	1-18-19	.....
512—Schodack	1-18-19	.....

Merchants Shipbuilding Corp., Bristol, Pa. Ships 8800 Deadweight Tons

Hull No.—Name	Date launched	Date delivered
597—Cabegon	12-14-18	.....
598—Wathena	9-11-18	2- 1-19
599—Watonwan	8-14-18	2- 4-19
600—Wanbesa	10-12-18	.....
608—Wynooche	2- 1-19	.....

Submarine Boat Corp., Newark, N. J. All Ships 5500 Deadweight Tons

Hull No.—Name	Date launched	Date delivered
547—Agawam	5-30-18	12-17-18
548—Alamosa	7- 4-18	†
549—Alcona	7- 4-18	†
550—Ingold	8-31-18	.....
551—Chariot	9-12-18	.....
552—Chetopa	7- 4-18	.....
553—Cokato	9-22-18	.....
554—Decatur Bridge	11-23-18	.....
555—Ft. Pitt Bridge	12-15-18	.....
556—Monana	9-12-18	.....
557—Phoenix Bridge	8-31-18	.....
558—Chicago Bridge	11-23-18	.....
559—Mt. Vernon Bridge	12-15-18	.....
560—Panola	9-22-18	.....
561—Onekama	9-28-18	.....
564—Hico	10- 6-18	.....
565—Opelika	10- 6-18	.....
568—Allies	10-14-18	.....
569—Consort	10-14-18	.....
572—Faraby	12-28-18	.....
573—Farnam	1-25-19	.....
Nesco	2- 8-19	.....
Jekyl	2- 8-19	.....

*Under trial.
†Trials completed.

ton. The boats built at the Bristol yard, operated by the Merchants Shipbuilding Corp., cost approximately $240 per ton.

The large Hog Island transports, 8000 tons, will cost about $340 and the Hog Island cargo boats, 7500 tons, are costing approximately $267 per ton. The Newark plant is worth about $15,000,000 and there is a large salvage value. Taking that into account, the Newark ships are being produced at a cost of $184 per ton.

The first ship built at Hog Island, it has been testified, cost $2,427,000. It has been figured that the cost of the first 17 ships manufactured there would be $1,894,000 each. A decrease from an average of $324 a ton for the first ships to an estimate of $212 a ton on vessels numbered from 25 to 50 was predicted. These cost figures are confessedly high, but it has been pointed out that the rapid production is what will count now. The initial ships in the water will be the first ones to take cargoes and therefore to earn money. With the present ocean rates prevailing, the managers believe that not only can a fair profit be earned but a considerable portion of the cost be paid back. The immediate need of ships therefore is still intense as the inquiries from abroad prove. Director General Piez of the Emergency Fleet corporation has announced that he has already received a bid for the first 25 ships produced at Hog Island.

"The offer came to us," he said, "from the American International Shipbuilding Corp. for a firm in a foreign country with whom it has connections. The cost would be reckoned on the average outlay for the first 50 ships produced by the plant. They are willing to wait nine months for the whole number of ships.

"It is wise for us to sell a great many of these ships so that we can use and have a better type for our own needs. We want larger and faster ships. The 7500-ton cargo ships can be used by foreign ship owners because their needs are now greater than ours.

"It is not that such ships could not be used by Americans, but we are building too many of this particular kind for our own use. They were ordered in such large numbers to meet the cargo necessity of the war."

France Stripped of Merchant Vessels

FRANCE'S weakness lies today in her merchant marine. While rated as one of the maritime powers prior to the war she has held but a secondary place. During the war, her marine suffered tremendous losses and the nation has not had the manpower or the industrial capacity to construct new tonnage. With the advent of peace, France must either depend upon foreign bottoms to transport the bulk of her trade or begin immediately to construct an entirely new merchant fleet.

Premier Clemenceau has already announced that his country will launch upon a shipbuilding program which will in a few years replace her war losses and provide the added tonnage demanded if France is to maintain an independent status in the world's commerce. But the French yards are incapable of rendering relief within the required time. This prompted an appeal to President Wilson to intervene in the matter. The petitioners asked that the allies assign to France sufficient German and Austrian shipping to replace, ton for ton, French ships sunk by the enemy. They also asked that an opportunity be given French owners to purchase immediately 1,000,000 tons of shipping built in England on conditions accepted by the British owners; that opportunity be given to buy immediately 1,000,000 tons of shipping built in the United States, and that American yards be opened to French owners for the immediate construction of 2,000,000 tons of cargo steamers with permission to transfer them later to the French flag.

M. Bouisson, the French commissioner of maritime transports and merchant marine, said:

"France, with a prewar tonnage of 2,500,000, has lost 1,000,000 tons. While Great Britain, Italy and the United States have succeeded during the war in increasing continually their capacity for shipbuilding, that of France has constantly diminished by reason of the military role she has played in the alliance. Not only has our mobilization been the most extensive of any nation during the war, but our industries have been the most radically dislocated in order to adapt them to war conditions. Our shipyards have produced heavy artillery and tanks both for ourselves and our allies. If these yards have

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been able to turn out some warships, the construction of cargo and mail vessels had to be abandoned in consequence."

It is no secret that the French have for some time been attempting to place contracts for new vessels with American yards. A number of wooden ships have been built here for them. The largest of these contracts was taken by the Foundation Co., New York. This company constructed yards at Portland, Oreg., and Tacoma, Wash., to build 40 wooden auxiliary schooners of 3000 tons each. Last summer, the French awarded this same company a contract for 20 additional 3000-ton wooden ships. At that time the shipping board refused to permit American yards to build ships of any description for foreign account so the Foundation Co. contracted to build the 20 in British Columbia. The 40 wooden auxiliary schooners have all been delivered, the last being turned over to the French on Dec. 28. The 20 building in British Columbia are to be 3000 tons deadweight, full powered, twin-screw cargo steamers. All the vessels are delivered complete down to the table linen, but not including stores.

Steel Tonnage Wanted

With the end of the war and the completion of the French contracts at the Portland and Tacoma yards, the Foundation Co. was approached with a proposal to build steel ships in those yards for the French government. It is reported that this company was offered a contract to build 174 steel ships, entailing an expenditure of something like $100,000,000. The shipping board, however, has not yet given its permission to domestic yards to build steel ships for foreign account and, with the war over, the French are not now so willing to accept wood ships when there is a possible chance of having steel vessels built. The request of the French to have 2,000,000 tons of steel ships built in American yards would bring considerable business to this side of the Atlantic. American shipbuilders fear that if the shipping board does not soon grant permission to let these contracts the French will find foreign yards which will undertake the work and the new business will be lost to this country.

The efforts expended by the French to build a new merchant marine are not sporadic. The government intends to carry through these efforts and its leaders promise that the French will have a merchant marine of 6,000,000 tons within a few years. The ambition of the French is destined to have an important bearing upon the future of the American merchant marine. Not all competition will come from British and Japanese shipping.

France has often been referred to by the opponents of subsidies to prove why subsidies do not always build up a merchant marine. France granted subsidies to shipbuilders and subsidies to ship operators and yet her merchant marine was not large at the outbreak of the war. Between 1907 and 1914, at the outbreak of the war, the French merchant marine increased but approximately 50 per cent, or at a slightly greater rate than did the total merchant marine of the world. During this same period the merchant fleet of the world increased about 41 per cent. The merchant tonnage of the United States increased but 35 per cent.

Despite the subsidies and the national consciousness of the French that a merchant marine was an absolute necessity, her fleet was not a great factor on the high seas. Its destruction by the German submarines has therefore accented the great weakness of this country. The public is undoubtedly well acquainted with that human document of the war which was published in the United States under the title "Odyssey of a Torpedoed Transport." Unwittingly it disclosed the weakness of the French, the lack of co-ordination of her shipping facilities at the outbreak of the war and the absolute dependence of the nation upon ocean bottoms. Americans read that document because of its intensely human appeal whereas it roused the French nation to a determination to rectify a situation which should have been corrected previous to the war.

It was not until 1915, however, that evidences of this interest were disclosed. Then it was reported that the French consul was discussing the necessity of establishing a direct French line from Puget sound to France. The country was then demanding great quantities of grain and food. Early in 1916 the Compagnie Generale Transatlantique inaugurated a freight line between La Pallice and New York. Still not much was done to relieve the shipping situation. France was depending largely upon England's assistance. In the fall of 1916, it was estimated that the French had lost 300,000 gross tons of shipping since the outbreak of the war and had constructed but 350,000 tons of new vessels.

Construction Seriously Handicapped

Under war conditions, new construction was extremely difficult in France. Not only was it necessary to give prime attention to the building of naval vessels, but every available man was withdrawn for military service. Despite this, it was announced early in 1917 that the Compagnie Generale Transatlantique has increased its fleet since the outbreak of the war by the addition of the important passenger liners La Fayette and Paris, and the new freight steamer La Perouse which had been constructed at Dunkirk. The submarine warfare became relentless and that year the Chargeurs-Reunis Steamship Co. let contracts with French builders for three freighters of 7000 tons each. It was intended to use these in the colonial trade to be run independently of the West African line. The route mapped out for these freighters included Antwerp, Dunkirk, Havre, Bordeaux, Lisbon, Kamerun, Gabor and the Kongo as far as Matadi.

During this time the French government was doing all in its power to build up a merchant marine, but so long as the Germans were fighting upon her territory this was difficult. Steel became extremely scarce and coal was so short that it had to be rationed. Resort was had to the building of small vessels of concrete which could be used on the rivers and canals. In 1918, the French chamber of deputies voted a credit of 1,500,000 francs to the French navigation bureau to construct tugs, barges, etc., for traffic on the lower Seine. Inasmuch as the French railroad systems were breaking down, the plan was to increase from 700,000 to 1,500,000 tons the water traffic from Rouen to Paris.

War Stopped Shipbuilding

The war prevented the French accomplishing anything in the way of quantity production in shipbuilding, although there are instances of dramatic achievement which are truly inspiring to the whole world. On April 24, 1918, the largest steamer ever built for the French was launched from the Chantiers de France at Dunkirk. This ship is 444 feet long, displaces 19,000 tons, and has a carrying capacity of 12,000 tons. Throughout the time this vessel was under construction, the Germans were making every effort to destroy it. Dunkirk was an easy prey to the Huns, being but a short distance from the enemy lines. The aerial raids, however, proved unsuccessful and the mighty steamer was launched at the time the Germans were making the last supreme drive to break through the allied lines.

Not all of France's heroism has been displayed upon the battlefield. The spirit of the people was equally displayed back of the lines, in the legislative bodies, the shipyards, on the high seas, and in the shells of organization maintained by the commercial houses of the country. All showed that the Frenchman was certain that the war would be won and that it was imperative to hold on to the channels of peaceful trade so that the country would be in a position rapidly to regain her position in the world of trade.

During the war France tried through

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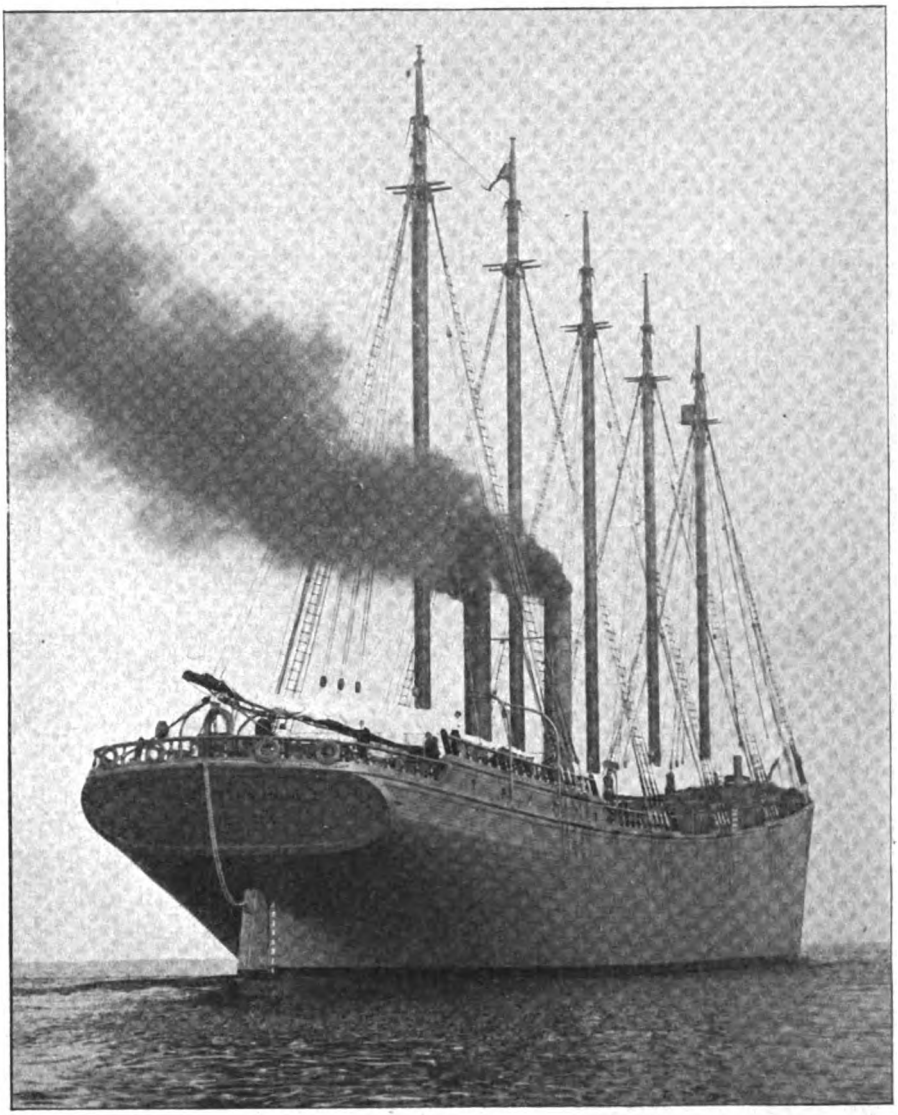
the medium of great fairs, with their outpourings of catalogs, pamphlets, leaflets and posters to acquaint the world with the excellence of her wares, and also to learn from the exhibits of others where French importers may look for their requirements. Fifty-three groups of manufacturers participated in the 1917 fair at Lyons, and 937 classes of articles were represented. The number of firms taking part in this fair was 2614 and the transactions totaled 410,000,000 francs. The United States took over 50 per cent of that business.

The exigencies of war compelled France to exercise a supervision over her exports and imports. She went steadily toward her goal of bringing trade under the strictest control, as did Great Britain and the United States, and now the government is taking advantage of that fact to insure the country against any private interference with rebuilding and rehabilitation. To accomplish a revival of industry at home, and the renewal of her foreign relationships, however, France must have easy and cheap communications with her colonies and other countries. The prime essential is ships, and the plans of France to obtain such a merchant navy are illustrative of the degree of efficiency she has attained in making war measures serve the purposes of peace.

Ships in Government Service

All seagoing vessels were requisitioned for government service and placed under the orders of the ministry of maritime transport and merchant marine. A rental was paid by the government and an allowance was made for expenses, maintenance, working capital and other charges. Shipowners themselves managed their fleets, and were encouraged by the distribution of bonuses to make them as effective as possible. When one of these ships was sunk the government undertook to replace it.

This replacement of ships is a cardinal point in French plans. During the war ships could not be built in France. The minister of marine held that to bring materials from the United States or England would handicap French shipbuilders because of the cost of the materials and transportation. That would have meant that French exporters would have to pay higher freight rates to the owners after the ships were put into the water. It would have placed not only the exporters but also French industry under a handicap in the competition for markets that would follow peace. Under the circumstances, the minister proposed that the state should replace destroyed ships. Only from the government would French yards accept orders. The minister contended that the state can buy materials more cheaply, and that, therefore, it will be able to contract for new ships on a basis that will insure reasonable rates to the trader of the future. The government intends to replace ships in this manner within three years after the war is ended. These ships will become the absolute property of those from whom their equivalents have been requisitioned.



WOODEN MOTORSHIP BUILT IN AMERICA FOR THE FRENCH GOVERNMENT

The high freeboard, tall funnels and the absence of topmasts, give to this type of vessel a decidedly unusual appearance. During the war, France placed contracts freely for wooden ships and she has plans for a great fleet of steel vessels from American yards awaiting permission of the shipping board

In addition, the ministry proposes to build a state-owned fleet for the colonies. This fleet will be managed by shipowners, but the state will share in the profits and in the deficits. Hereafter, it is intended, no more subsidies will be made for ships in which the government has no interest. The colonial fleet will be used in the trade of the French colonies, either with France or with other countries, and will be the lever by which the government will control cargo rates and the selling price of imports. Steps have also been taken to have the fleet now waiting for repairs put immediately into shape for service. This work will require time.

With these plans for increasing the merchant navy, so essential to the development of foreign trade, go others for the improvement of harbors. France has today no harbors where ships of the largest type can dock. Many available places are being explored, and plans have in some cases been drawn for the enlargement of harbors and the reconstruction of ports on a scale commensurate with French hopes for a revival of foreign trade. Closely related to this development of ports is the plan to co-ordinate railroads and shipping lines, especially across the Mediterranean to Algiers and Tunis. A project which has received considerable attention is the improvement of the Rhone river from Geneva to Lyons, which would give Geneva an all-water route to the sea through Marseilles. The cost of the project is estimated at $70,000,000 and it is proposed to utilize the locks for the generation of electricity for Lyons and Paris.

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Marine News in a Personal Way

Intimate Gossip About What Leaders in the Maritime World Are Doing

ADMIRAL F. T. BOWLES has resigned as assistant general manager of the Emergency Fleet corporation. It is believed that he will be retained in some other capacity in the service of the corporation. He was formerly chief constructor in the United States navy. Admiral Bowles was born in Springfield, Mass., in 1858, and graduated from the United States naval academy in 1879. He also holds a post graduate degree of naval architect from the Royal Naval college, Greenwich, England. He has been associated with the upbuilding of the new United States navy from its beginning. In 1882 he was connected with the naval advisory board and for 14 years he was head of construction and repairs at the navy yards at Norfolk, Va., and New York. He was active in the introduction of civil service reform in employment of navy yard labor. As assistant general manager of the Emergency Fleet corporation, Admiral Bowles held an important position as he was in direct contact with both steel and wood ship construction. He was given power to approve or veto any proposal for the expenditure of funds, or to change plans for construction at Hog island. In accepting Admiral Bowles' resignation, Charles Piez, director general of the Fleet corporation, paid a high tribute to his services: "Your work with the Fleet corporation has been so valuable both in its creative and its administrative sides, and your experience and advice have been so helpful to all of us that I accept your resignation only with the greatest reluctance. Permit me to assure you that you have established a reputation for success and efficiency with the Fleet corporation that is beyond the power of criticism to impair."

* * *

DR. CARLOS RUGGIERRI, who is connected with the Italian food ministry, has been elected a director of the United States Steamship Co. and its subsidiary companies. Dr. Ruggierri succeeds B. G. RIGLEY, who has resigned.

* * *

JAMES O. HEYWOOD, Chicago, has resigned as manager of the wood ship division of the Emergency Fleet corporation. The wood ship department has been taken over by the steel ship division with DANIEL H. COX in general charge. Before resigning, Mr. Heywood pointed out that 101 wooden ships had been built of which number 94 were in active service.

* * *

J. D. LOWMAN, assistant director of operations of the shipping board for the Washington district, has resigned.

ADMIRAL F. T. BOWLES

He will be succeeded by D. W. BURCHARD, who was his assistant. Mr. Lowman was forced to leave the shipping board on account of pressing private business interests. He took up his duties with the shipping board about a year ago.

* * *

MILTON J. BUDLONG has resigned as vice president, general manager and director of Gaston, Williams & Wigmore and also as vice president and director of the Globe line of steamships which is a subsidiary concern.

* * *

W. P. TEEGARDIN recently was appointed manager of the Overseas Shipping Co.'s Seattle branch office. He succeeds CLARENCE A. LOCKHART, who has been promoted to vice president and transferred to the company's Boston office. Previously, Mr. Teegardin held the position of assistant manager at the Seattle office, having served in this capacity since the company first opened that office. The Overseas Shipping Co. is engaged in shipping operations on a large scale and notwithstanding that it is a comparatively new organization it handles a large volume of business.

* * *

LLOYD C. HERRING has joined the organization of L. W. Ferdinand, Boston, manufacturer of marine glue and kindred products. For more than 13 years, Mr. Herring was connected with the Boston office of the General Electric Co. For the past 10 years he was assistant to the district manager of the apparatus sales department of that company. Mr. Herring will act as sales manager for the Ferdinand company.

* * *

CAPT. WILLIAM D. SOUTHWICK has been appointed supervisor of recruiting stations for the United States shipping board. He will have charge of 3000 official enrolling agencies at which shipping board recruits men for the merchant service. Captain Southwick will be stationed in Boston, which is the national quarters for the shipping board's recruiting service.

* * *

ROBERT M. KING, head of the special dispatch agency of the shipping board, has resigned to take up private business. He will be succeeded by EDWARD H. DUFFEY.

* * *

CAPT. JOHN F. BLAIN, Northern Pacific district manager of the Emergency Fleet corporation, has not resigned according to D. M. Callis, assistant in charge of steel ship construction in Captain Blain's district. Reports of Captain Blain's resignation received wide publicity owing to the fact that he was taken seriously ill during a recent visit to the Emergency Fleet corporation's home office.

* * *

S. B. STOCKING has been appointed assistant general freight agent of the Pacific Steamship Co., Seattle. He succeeds M. J. WRIGHT, who sailed recently for Manila to look after the company's interests in the Philippines.

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Ocean Rate Situation Hurts Trade

Reductions in Freight Charges Add to Uncertainties of Exporters and Shippers—Release of Ships from Government Control Urged

AMONG the many outspoken criticisms of the ocean rate cuts authorized by the British and by the shipping board were the statements recently made by R. C. Thackara, vice president of the Luckenbach line, George F. Trowbridge, president of the Strong & Trowbridge Co. and head of the American Exporters and Importers association, Frank C. Munson, president of the Munson Steamship Co., and A. H. Bull, president of the A. H. Bull Steamship Co.

Mr. Thackara said that the export situation had become so hopelessly tangled that an application was made to the shipping board recently for permission to sell 18 vessels belonging to the Luckenbach line. This was refused. He continued: "We have 12 ships in operation and 6 building, and we can neither operate them successfully under the mandatory methods of the shipping board, nor can we obtain permission to dispose of them to prospective purchasers who are anxious to possess them.

Crippling Export Trade

"Uncertainty and demoralization are killing the country's export trade. What we want more than anything else are rates so stabilized that we can afford to engage in business on a prewar basis. Our idea as to stable rates is to have the shipping board retire from the field entirely and give way to free and open competition. Only in the sense of the survival of the fittest can America's export trade assume any importance at all.

"We have been engaged in the business of shipping for 50 years, and we think we know something about it.

"To illustrate the export situation on the Atlantic today, let me say that to France there are three distinct rate tariffs in force, namely, privately owned ships carrying cargoes at $60 a ton, vessels operated by the French government, with a $27 rate, and shipping board vessels with a $28 rate. There is very little cargo space available on the French ships, and those vessels controlled by the shipping board, as a result of which we are glad to accept the higher $60 rate. In fact, the situation has reached a point where we should be perfectly satisfied with even a higher rate provided such action does away with the demoralization of fluctuating scales.

"Another thing. There is much talk just now of the freedom of the seas. The American shipper is denied this by the shipping board. If we desire to make shipments to a certain port abroad we are told that we cannot do so because some other line is shipping to that particular destination. Our course over the world is outlined by the board, and we must follow instructions. It seems that if we are to engage successfully with foreign competition these millstones should be removed.

"What we need most today is intelligent and constructive effort on the part of the shipping board to assist the exporters and the shippers. Internationalization of the world's shipping will not help the situation any more than will government ownership, to both of which we stand opposed. Without urgent action the entire export trade of America stands in grave peril."

Situation Not Understood

"I am in receipt of information from reliable sources that the British are continuing to make freight cuts," Mr. Trowbridge said. "So far we have been unable to meet British competition, due to laxity, inability or incompetence at Washington. Nobody seems to want to do anything down there until Mr. Hurley returns from abroad. In my belief the trouble is that nobody in Washington appears to understand the export situation. We have been holding conferences, but nothing comes of them.

"The recent cut instituted by the shipping board affects only cross-Atlantic trade. From our viewpoint this is but a tithe compared with world trade, which the United States is more interested in just now. We are exporting very little to France, and we are having trouble in getting export licenses to that country. British trade with us is just opening up. The great bulk of exports, however, is to the world in general—to Australia, China and Japan and South America. Here we are unable to compete with British freight rates.

"Furthermore, the British have promulgated discriminatory rates against our exports by cutting the rates out of Liverpool for Australia and maintaining the same old schedule of higher rates out of New York. This has placed us at a disadvantage. Moreover, many American exporters were already signed up for some time on the old rates when suddenly these were cut, leaving the exporters subject to the higher schedule. This simply goes to show the sharp competition to which the American exporters are being put to place their wares abroad.

"The British freight rates were cut from 25 to 33 1-3 per cent after the signing of the armistice and they have been gradually going down since. It appears that the intention is to keep these rates always a bit lower than the American schedule."

Retards Manufacturing

"Manufacturers of the country are shutting down their plants because they do not know what the policy of the government is in connection with steamship rates or whether its policy will place them in a position to compete with foreign manufacturers. As a result tens of thousands of positions which otherwise would be open to our returning soldiers are being abolished."

This statement was made by Frank C. Munson, president of the Munson Steamship Co., in summing up the present state of America's export trade. His company operates 100 chartered vessels to all sections of the world. Mr. Munson also for a year was a member of the war trade board.

"Few people in the United States," he continued, "realize how intimately connected are the great labor problems of today with the export and steamship business. The government can largely help to rectify this difficulty by promptly doing away with all of the war time restrictions on shipping.

"This will lead to a continuance of manufacturing by plants that otherwise will shut down because of the uncertainties.

"I have been in favor of proper methods of government control during the war period, but believe that now every effort should be made by the officials to remove the restrictions. Then our merchants, exporters and manufacturers will be able to take care of their business in the old established ways.

"The rates issued by the shipping board were to meet the published British rates, but they are only a temporary measure, as the British will again cut their rates, which we must meet after considerable delay in waiting for government officials to consider the matter, accumulate facts and then take action.

"A great work has been done by the various government departments during the war time, but we are a great republic founded on individual liberty,

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After-War Problems of New Orleans

Peace Brings Call for Quick Action to Place Gulf Port in Commanding Position in Latin-American Trade

By H. H. Dunn

AN interesting condition confronts exporters and importers at New Orleans as the new year of peace begins. This condition is difficult to understand unless consideration is taken of several factors, some of them seemingly diametrically opposed to others, which combine to place the gulf port in its present position.

The foreign trade of New Orleans doubled in the seven years from 1911 to 1918, yet in that time New Orleans dropped from second to sixth place among the ports of the United States.

Exports from New Orleans in 1917 were more than double those of 1914, the year in which the war commenced; imports in the same period increased approximately 40 per cent, yet the exports of raw cotton during that time fell off more than $8,000,000 in value, while the imports of coffee decreased by approximately $6,000,000.

Free of Congestion

New Orleans was the only major port in the United States in which there was no congestion during the war; in which there was no harbor disaster or sabotage, and the only one in which no ship was detained beyond its scheduled hour of departure. Yet New Orleans was one of the least-used—possibly the least-used—of all the ports of the country in the handling of government shipments to Europe. During the war an average of 90 ships of all classes left the port of New Orleans each month, whereas the harbor has first-class accommodations for the handling, theoretically, of 8000 ships a month. Certainly, in actual practice, it could have handled 800 to 1000 instead of the paltry 90.

Coupled with these factors came complaint, late in December, from certain shippers and from agents of the shipping board, that the Public Belt railroad, which connects every wharf on the waterfront with every trunk line railroad entering the port, had not been delivering cargoes properly or promptly to ships docked at these wharves. So strong was this complaint that reports were current that the United States railroad administration had been asked to take over the Public Belt, and was considering this step. As a result of this report, Mayor Martin Behrman of New Orleans, requested B. L. Winchell, regional director for the railroad administration, with headquarters in Atlanta, Ga., to inspect personally the situation in New Orleans. The mayor placed the responsibility for the accumulation of 2000 cars of unloaded freight on the Belt tracks in December on lack of ships. There the matter rests.

All these factors tend to make the foreign trade future of New Orleans uncertain, but there are certain bright spots along the way which seem to indicate a betterment of conditions, at least in Latin-American trade, although there seems to be little hope of the Louisiana port getting much of a share in after-the-war European trade unless the shipping board can be persuaded to allocate more deep-sea bottoms to New Orleans.

Arrival of the large steamer PANAMA MARU, owned in Tokio, from Yokohama, Panama and Rio, with a cargo of 87,000 bags of coffee from the Brazilian port and her sailing with a full cargo of cotton and machinery for Japanese ports, has opened the "Asiatic Triangle," though the "European Triangle" remains Liverpool, New York and South America, with the return of the Lamport and Holt liners to that service. Other Japanese ships are to follow PANAMA MARU with regular arrivals and sailings, and this schedule will materially aid the coffee trade, virtually the most valuable of all imports through the port of New Orleans.

In addition to this, the SANTA CRISTINA, an American steamship of 2119 tons gross, built in 1917 by the Aberdeen Shipbuilding Co., Aberdeen, Wash., has been purchased at a price reported to have been $300,000 by the recently organized New Orleans & South American Steamship Co., and put in freight service between New Orleans and South and Central American ports. Her first cargo was coffee from Colombia. This company will soon have three steamers in the Latin-American service, SANTA CRISTINA being the second purchased for its fleet.

Another ship movement of importance to New Orleans was the return of CHALLENGER, the first ship released to gulf ports by the shipping board, which left the Crescent City late in December, bound for England, with 29,000 bales of cotton and 3500 tons of pig iron. CHALLENGER is of 11,800 tons and came consigned to the J. H. W. Steele Shipping Co., New Orleans. She was built by the Bethlehem Shipbuilding Corp., at Alameda, Cal., and her maiden voyage was from San Francisco to Iquique, Chile, with general cargo. From the Chilean port, she came loaded with nitrates, to Pensacola, Fla., and then to New Orleans. In addition to CHALLENGER, two other steamers, BEUKLSDYJK, to carry cotton to France, and WESTERDYJK, to handle general cargo between New Orleans and the River Plate—were released by the shipping board.

Causes of Decline

The anomalous condition mentioned previously, in which New Orleans, though doubling her foreign trade in seven years, fell at the same time from second to sixth place, presents the following figures:

1911

1.—New York	$1,654,145,138
2.—New Orleans	239,557,588
3.—Galveston	224,035,862
4.—Boston	188,131,522
5.—Philadelphia	153,583,027

1918

1.—New York	$3,868,641,053
2.—Seattle	584,986,644
3.—San Francisco	480,982,225
4.—Philadelphia	474,172,025
5.—Boston	454,116,440
6.—New Orleans	418,536,295

During those years, New Orleans remained in second place during 1912, fell to third place in 1913 and 1914, rose again in 1915 to second place, dropped in 1916 back to third position, and then started on the toboggan in 1917, slipping down three places in one year. New Orleans exporters and importers, and others interested put the responsibility for this entirely on lack of ships, but in the opinion of many others there are two additional factors equally important. One is the longer haul from New Orleans around the tip of Florida before the freighter really gets started for Europe, and the second is the lack of ship owners in the port of New Orleans. Virtually all the ships which ply out of New Orleans are owned elsewhere; compared with New York, Boston, Philadelphia, or even with Seattle and San Francisco, practically no ships are owned in New Orleans. Scores of vessels have been built in the south since the war began, but all were built for owners in other American ports or in Europe. None,

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of which record can be found, was built for New Orleans owners.

The first condition, of course, is geographical. Orleanians are not responsible for the putting of Florida and the Carribbean isles between their port and the Atlantic, but they cannot remove this condition by emphasis on the lack of ships. In other words, if the exporters of New Orleans had banded themselves together into ship owning companies—as did the exporters of some other ports—instead of waiting for others to build their ships for them, there would now be ships to be returned to New Orleans. Instead of this, New Orleans exporters are now dependent on such ships as may not be needed for service in other ports.

This, of course, does not apply to the United Fruit Co. (not a New Orleans corporation); the Bluefields Steamship Co., or others, who just now are trying to get back their ships from the government. Yet the ships belonging to these companies merely will return to the same service they were performing before the war began; they will be of little aid in that great new commerce with Latin-America, which New Orleans must go after with ships now, if she expects to have it and to hold it against the trade-seekers of Europe.

In striving to incite the exporters and importers of New Orleans to greater efforts, the foreign trade bureau of the Association of Commerce of New Orleans, has compiled figures comparing imports and exports of 1914, when the war began, with those of 1917—the last complete annual figures available. These show that exports through New Orleans in 1914 were worth $193,796,559 and rose to a value of $303,435,809 in 1917. Imports in 1914 were worth $79,876,075 and in 1917 had risen to $116,122,000.

Some idea of the leading articles imported may be gained from the following list of a few of the principal cargoes and their value:

Commodity	1914	1917
Nitrate of soda	$362,922	$5,512,800
Coffee	33,499,294	26,034,323
Sisal	10,796,370	21,580,447
Bananas	4,896,739	5,899,801
Sugar	16,232,623	39,396,000

Leading exports and their valuation according to the Association of Commerce report were:

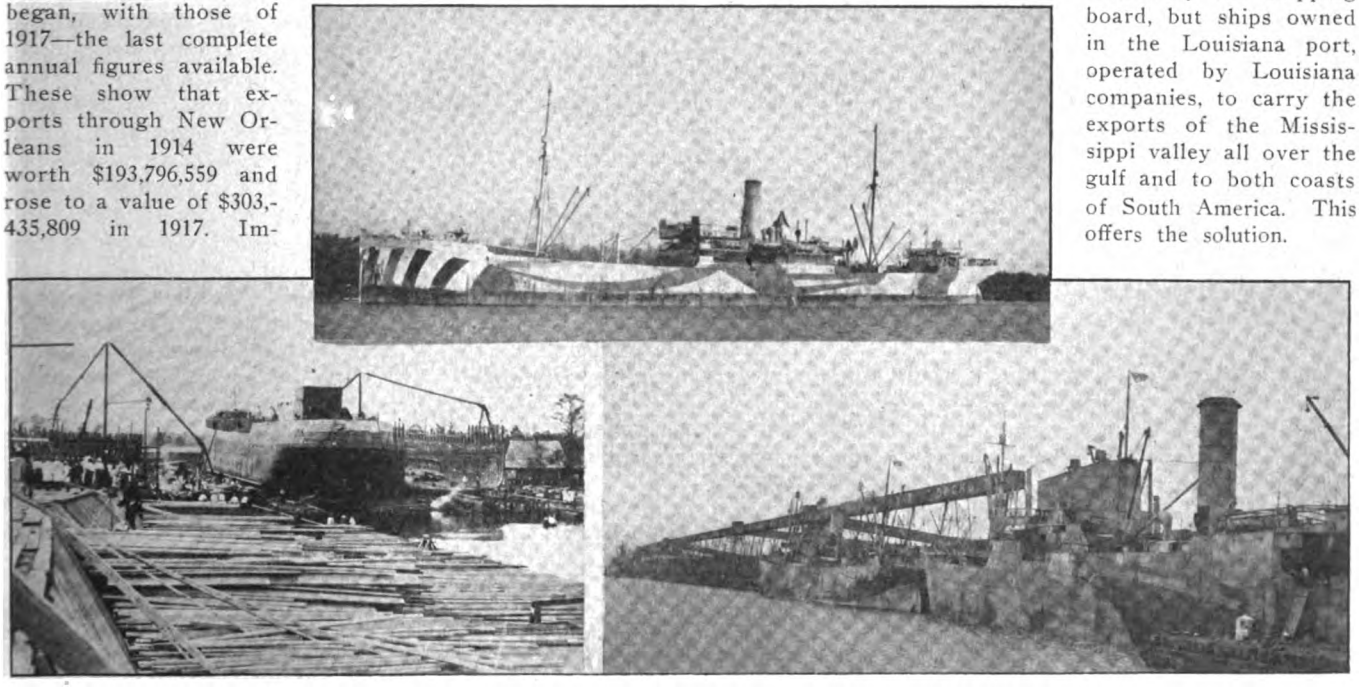
	1914	1917
Corn	1,336,800	5,510,124
Wheat	12,140,955	48,893,233
Wheat flour	5,586,254	16,638,111
Cotton raw	105,957,675	97,304,146
Cotton linters	.....	6,746,166
Pig iron	322,262	2,168,372
Steel billets	26,404	11,470,807
Mfgrs. of iron and steel	1,512,188	12,165,628
Lard, pure	4,178,160	5,981,886
Lard, compound	341,643	2,136,082
Illuminating oil	6,395,996	4,774,427
Gasoline	708,987	8,143,132
Naphtha	414,264	6,319,857
Sugar refined	102,422	7,013,637
Leaf tobacco	1,947,955	6,657,377

All the imports increased with the exception of coffee, which fell off because of lack of bottoms in the Latin-American trade. Coffee has been coming through the port of New Orleans for half a century, or more, yet New Orleans has to look to a Japanese steamer line to restore the coffee trade to her. It is interesting to note that in the exports, raw cotton and illuminating oils were the only ones which decreased.

Important information is concealed in the figures on the importation of nitrates, which was 16 times as much in value in 1917 as in 1914. The record shows that trade with Chile is developing, for every ship which brought in nitrates, carried back a full cargo of general merchandise, machinery and coal. Machinery alone is going to Chile from New Orleans at the rate of about one million dollars' worth a year.

Approximately 100 per cent increase is shown in the imports of sisal in 1917 over those of 1914, and 1918 will show an even greater gain, according to A. E. Pradillo, manager of the foreign trade bureau of the Association of Commerce. This growth in the sisal trade means regular steamship service to and from Mexico and, consequently, an increase in the exports from New Orleans to that country. About one million dollars' worth of merchandise goes to Mexico monthly from New Orleans at present. This consists of electrical apparatus, shoes, dry-goods, machinery, soap, rice and general provisions. It could be enormously increased, if New Orleans interests had ordered the gulf coast shipbuilders to construct even a few auxiliaries, for use in the gulf trade.

The Webb act, authorizing combinations for export business, and the revival of traffic on the Mississippi river by means of government-owned barge lines, are proving large factors in the development of Latin-American trade, but the great need of New Orleans is ships, and more ships. These should not be bottoms borrowed from some other port, or loaned by the shipping board, but ships owned in the Louisiana port, operated by Louisiana companies, to carry the exports of the Mississippi valley all over the gulf and to both coasts of South America. This offers the solution.



OWING TO LACK OF FREIGHT TONNAGE NEW ORLEANS' RANK AMONG AMERICAN PORTS DROPS AS TRADE EXPANDS

Increase in foreign trade of the gulf port has fallen below record of other cities. One section of the 14 miles of improved New Orleans harbor front is shown at the right. No congestion occurred here during the war. The vessel above is the Japanese ship AWA MARU which is reviving the coffee trade on the Asiatic triangle. The vessel at the left is being built near New Orleans but not for ship owners of that port

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Rail Rates Cripple Pacific Trade

Failure to Restore Old Tariffs on Exports and Imports Hampers Competition With Ports on Atlantic and Abroad—Relief Asked

By Cruse Carriel

DISPARITY between the combination ocean and rail rates from interior points in the United States to the Orient via the Atlantic seaboard, as compared with direct rail and ocean rates through Pacific ports has virtually wiped out the entire business of exporters and importers operating on the Pacific coast. There is at the present time a feeling of unrest and uncertainty among those who are engaged in this business, which carries with it a distinct danger to the restoration and future growth of the foreign trade through these ports. The present transcontinental rates on the bulk of the commodities entered on the west coast are such as to absolutely prohibit even the contemplation of doing business through the Pacific ports and this is equally true of the transcontinental rates on American goods intended for export to the Orient.

Remove Foreign Trade Rates

This condition, which is not overdrawn and which is responsible for a near-panic among western commercial interests, was brought about, primarily, by the action of the railroad administration on June 24, 1918, in reducing the number of commodities for which export rates were provided from 88 to 17 and the number of commodities for which import rates were provided from 205 to 31. Thus the export rates on 71 commodities and the import rates on 174 commodities were cancelled under the stress of war necessity and while shipping was confined largely to the Atlantic.

But with the signing of the armistice and the release of shipping, conditions have changed. Exporters and importers maintain—and the facts justify their contention—that the movement of goods through Pacific ports to and from the Orient is impossible under the prevailing high rail rates, which approximate the rates charged by the carriers when the Pacific export and import business was in its infancy and before the shippers obtained an equalization and an adjustment of rates.

Just as an example: Oriental vegetable oil, packed in barrels, can be shipped from Shanghai to Cleveland, via the Panama canal and New York for less money than the same shipment could be made from Shanghai to Cleveland via San Francisco. This is at the present rail rate to Cleveland of $1.12½ per hundred pounds, as compared with 60 cents a hundred pounds under the old schedule which was cancelled June 24, 1918. Ocean freight rates between Oriental and Japanese ports and those on the Atlantic seaboard are now and are expected to remain the same or nearly the same as the rates between these Oriental ports and the Pacific coast. With this in mind, the western interests point out the impossibility of importing commodities for distribution to manufacturers at points on or near the Atlantic seaboard, or even to points in the Middle West, such as Cleveland, Cincinnati, Chicago, Kansas City, St. Louis and Buffalo.

The differential between the old and new rates on spices walnut meats, nuts, seeds, tea and gums, is of such huge proportions that a New York importer, under the present rail and water rates, can ship spice from the Dutch East Indies to New York and thence inland as far as St. Louis, Kansas City and Chicago, at a less rate than the Pacific coast importer can move the same commodity from the same point of origin to the same destination via San Francisco. The rail freight rate from New York City to these points on such commodities as spices, seeds, teas and gums, is in the neighborhood of $15 a ton. When this is added to the long ocean route rate, a preferred differential of from $10 to $15 a ton is created over the combination rate from the Oriental port to the inland point via San Francisco.

In a general way, it may be said that the present transcontinental rates inhibit the importation through Pacific ports of such commodities as beans, cocoanut cake and meal, cottonseed cake and meal, coffee, copra, gums (such as copal, damar, kowrie, shellac and gam bier), kapok, matches, nuts (including peanuts and walnuts, shelled and unshelled), vegetable oils (such as soya bean, China wood cottonseed, cocoanut, fish, rapeseed and peanut), rice, sago, tapioca, sago, tapioca and potato flour, seeds (such as alfalfa, canary, cloves, hemp, millet, rape, sesamum, sorchum and sunflower), skins and hides, spices (such as cassia chillies, cinnamom, cloves, condiments, ginger, mace, nutmegs and turmeric), animal tallow and tea.

The present rates are a positive barrier, it is maintained, against the exportation through Pacific ports of chemicals, drugs, dyestuffs and iron and steel, such as angles, bars, nails, rails, rods, shapes staples and wire.

Lower Cost Via New York

The transcontinental rate on steel and iron products from eastern manufacturing centers to San Francisco and other Pacific coast terminals is now 85 cents per hundred pounds, as against the old rate of 40 cents. This rate, together with the ocean rate from the Pacific coast to Japanese and Oriental ports exceeds the combined rate from Pittsburgh and other eastern manufacturing centers to Japan and the Orient via New York by $7.50 a ton. With the recent announcement of a further cut in the rates from north Atlantic ports to the Orient, the differential is even greater than this amount.

This, then, is a rather general statement of a national problem, focusing on the west coast, but which includes the question of competition on the part of the whole country with Asia and Europe. The solution, westerners believe, is the immediate restoration of the import and export transcontinental rates which were effective prior to June 24, 1918. Pacific coast interests, more than anything else, desire that the railroad administration announce its intention to restore these rates, even with a 25 per cent increase for such an announcement, it is felt, would serve to restore the confidence of importers and exporters in Pacific coast ports.

The old rates, it is pointed out, were not the result of any sudden demand on the part of the shippers or concessions on the part of the railroads, but they were gradual modifications in the then existing tariffs, brought about by experience after a thorough investigation extending over a period of nearly 20 years. Such

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rates were found to be necessary in order to move raw materials in and finished products out via Pacific ports in competition with the ocean route via the Suez canal and later the Panama canal. The transcontinental railroads either had to make these rates or do without the business which would be diverted via the Atlantic coast.

Predicts Trade Will Be Retarded

Charles Converse, foreign trade expert, makes an interesting comment on the situation as it now exist He says:

"It might be claimed that if these raw materials cannot enter and the finished products leave the country through the Pacific ports, they would do so by way of the Atlantic ports by taking the longer ocean route through the Panama canal. This is true to an extent, but if the construction program of the shipping board is fully carried out there would be in 1921 about 20 per cent less tonnage in the world than if no war had taken place. Inasmuch as there was no surplus of tonnage prior to the war and in view of the fact that there will be a much greater demand for tonnage now than then, it must be evident that there will be a shortage of ship tonnage.

"It is nearly 5000 miles further from New York to the Orient than it is from San Francisco to the Orient. Rates between the two American cities and the Orient are nearly the same, despite the distance. The consequence is that if Pacific commerce is forced to take this longer ocean route because of the railroads' refusal to reduce the import and export rates, it will mean a material reduction in the available ocean tonnage. This is true, because a ship operating between San Francisco and the Orient could make almost two voyages as compared with one via the Panama canal to and from New York City. Reducing the available tonnage in this manner and eliminating competition via the Pacific coast would create a natural tendency to increase rates and thus place the American manufacturer at a disadvantage. Lower import and export rates bring the manufacturing districts of the interior nearer tidewater and thus offset to a degree the advantages possessed by European countries where the rail haul is much shorter."

This argument, and, in fact, many of the arguments of the proponents for the restoration of the old export and import tariffs, so far as exports are concerned, does not give sufficient consideration to the actual time in transit of cargoes originating in the interior. Generally speaking, the time in transit is about the same whether a cargo is shipped to the Orient via the Atlantic or the Pacific ports, while the cost of rail transportation is of course higher than water transportation. This statement is almost equally applicable to imports, unless the government is disposed to assist the Pacific coast, as the privately-owned railroads did.

The reason for this parity in time is that the railroad administration requires a headway of 35 days on shipments from interior points near the Atlantic seaboard when routed through Pacific ports, compared with 10 days when the shipments are routed through the Atlantic ports. A shipment of steel from Pittsburgh, for instance, must leave there by rail 35 days before the steamer which is destined to carry it is scheduled to leave the Pacific port. This differential of 25 days practically equalizes the ocean sailing time from north Atlantic ports and from Pacific ports to the Orient.

There were 1642 fewer steam and sailing vessels entered and cleared at the port of San Francisco during 1918 than there were during 1917. The total tonnage entered and cleared dropped from 14,214 681 to 11,131,963 during the same period. In January, 1919, as compared with January, 1918, there was a decrease of 111 vessels, representing 129,918 tons entered and cleared.

Frisco Trade Slackens

The tonnage of steam and sailing vessels arriving at and departing from San Francisco during 1918 and 1917 was as follows:

Steam Tonnage Departures

To:	1918	1917
Foreign ports	1,307,638	1,713,902
American other than coast...	801,712	780,888
Coast	2,538,945	3,617,274
Total	4,648,295	6,112,064

Sail Tonnage Departures

Foreign ports	169,455	127,206
American other than coast...	92,657	99,941
Coast	781,083	799,917
Total	1,043,195	1,027,064
Total number vessels	4,566	5,417

Steam Tonnage Arrivals

From:	1918	1917
Foreign ports	1,110,668	1,476,146
American other than coast...	638,233	1,028,255
Coast	2,647,513	3,570,849
Total	4,396,414	6,075,250

Sail Tonnage Arrivals

Foreign ports	228,740	132,003
American other than coast...	115,909	97,645
Coast	700,410	770,655
Total	1,044,059	1,000,303
Total number vessels	4,561	5,352

Figures for January, 1918 and 1919, are:

Steam Tonnage Arrivals

From:	Jan., '19	Jan., '18
Foreign ports	72,874	117,985
American other than coast...	73,585	33,064
Coast	218,237	259,734
Total	364,696	410,783

Sail Tonnage Arrivals

Foreign	10,371	20,981
American other than coast...	7,658	5,343
Coast	51,966	65,760
Total	69,995	92,084
Total number vessels	342	408

Steam Tonnage Departures

To:	Jan., '19	Jan., '18
Foreign ports	124,253	114,209
American other than coast...	76,559	72,426
Coast	188,310	255,977
Total	398,122	442,612

Sail Tonnage Departures

Foreign ports	13,615	14,949
American other than coast...	5,317	3,258
Coast	47,786	65,760
Total	66,715	83,967
Total number vessels	352	397

Another indication of the seriousness of the situation to the Pacific coast was the announcement of the Robert Dollar Steamship Co., made Feb. 4, of intention to transfer the company's fleet of steamers, formerly operating out of Vancouver, B. C., to New York.

Ocean Rate Situation Hurts Trade

(*Concluded from Page* 157)

and the sooner normal conditions are restored the sooner we shall begin to stimulate all our industries."

A. H. Bull, president of the A. H. Bull Steamship Co., controlling a line of 35 steamships, said that the government in making a low rate across the Atlantic on cotton had permitted England, the heaviest importer of cotton, not only to manufacture piece goods, but to compete successfully with American manufacturers in the markets of Italy, France and the United States. He added:

"Under existing conditions England can force our mills to stand idle while she remains busy. Under the prevailing low freight rate applying to cotton, along with cheap labor and cheaper freight rates, not only can she compete in Italy and France, but can export her manufactured goods directly to the United States and undersell the American manufacturer.

"We have found it a difficult problem to do business under present circumstances. The outstanding feature of the export problem today is for us to meet the British cuts in freight costs. There is no better way in which this can be done than for the government to take its hands off just as soon as it can and restore the ships to their proper owners. Otherwise there should be some international export trade arrangements.

"The new transatlantic rate schedule recently put into effect by the shipping board appears to be satisfactory for the present, but it is only a question of time when the British will make further substantial reductions in their freight schedules and we must follow suit."

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Activities in the Marine Field

Latest News from Ships and Shipyards

Several Lake Vessels May Change Hands

ACCORDING to present indications, the changes in the Great Lakes fleet this winter will be comparatively slight. During the past few years, a large number of freighters were sold. Some tentative plans are in progress, however, and several vessels may change hands before getting up steam for their initial 1919 voyages. No bulk freighters are to be added to the fleet this year. The wrecking steamer FAVORITE, which is to replace the vessel by that name taken over by the government for use in foreign waters, as described in THE MARINE REVIEW for January, 1918, is the only new vessel for lake service which will be commissioned this year. The FAVORITE is under construction at the Cleveland yard of the Great Lakes Towing Co. She will be ready for service by the opening of navigation. Work on her construction was seriously hampered at times during 1918 by the lack of skilled labor.

* * *

The contract for a new cutter to replace the MORRILL at Detroit, for patrol duty on Lakes Ontario, Erie, St. Clair and Huron, has not been awarded owing to the fact that the appropriation for construction of this vessel at the present time is insufficient.

* * *

Lake yards continue their splendid showing in building boats for the Emergency Fleet corporation this winter and a number will be ready for delivery at the opening of navigation. Two steamers were recently launched at yards of the American Shipbuilding Co. The majority of lake builders have all they can do at present; in fact their contracts will extend well into the season.

* * *

At the annual meeting of the grand lodge of the International Shipmasters' association, held in Chicago recently, Capt. W. L. Girardin, master of the steamer HARRY W. CROFT, who represented the Cleveland lodge, was elected grand president to succeed Capt. W. J. Crosby, Detroit. The other officers chosen are: Capt. Lee DeNike, Detroit, vice president; Capt. M. F. Morgan, Chicago, secretary; Capt. J. D. Baird, Marine City, treasurer. The 1920 meeting, it was announced, will be held at Toledo, the last week in January.

* * *

Capt. Alex Cunning, wrecking master of the Great Lakes Towing Co., has invented a wrecking device which he has patented in the United States, Canada, England, France and in other foreign countries. Captain Cunning has had a wide experience in wrecking work, holding a record of 128 successful operations with only one failure. He is probably the best known wrecking master on the Great Lakes, the St. Lawrence river and gulf. Captain Cunning's device works on the principle of a double pontoon system and John F. Hogan, Detroit, and A. L. Wilkinson, Windsor, Ont., have begun work on its construction.

* * *

The city association of commerce, Milwaukee, has taken steps to get another line in operation to relieve the freight situation. The rates to be charged are the same as railroad rates but the switching problem at Chicago will be avoided, inasmuch as the new line is planned to run to Michigan City, Ind., where it will connect with eastbound freight lines.

* * *

The RELIANCE, a small steamer hailing from Sandusky, O., was recently placed in commission to run between Sandusky and Lake Erie islands. She is engaged in transporting passengers and freight and will continue in commission as long as weather conditions are favorable for her operation. Capt. John Newman, her owner and master, decided to put her in commission at this time of the year owing to urgent requests by island residents.

* * *

Owing to the unusually mild winter, Sault Ste. Marie, Mich., for the first time in its history, faces the possibility of not being able to harvest enough natural ice for next summer's consumption. As yet, no ice has been taken from St. Marys river and in the quietest waters the ice is only 6 inches thick. Even if ice were plentiful, there is no snow on which to haul it. Last year in January the ice on the river was 27 inches thick. In January of the present year the ferry boat was plying between Sault Ste. Marie, Mich., and Sault Ste. Marie, Ont.

* * *

At Buffalo, a large amount of marine repair work is in progress. Some of the vessels are in drydock where they will remain for several weeks. One of the vessels drydocked is the steamer G. G. BARNUM. The M. A. REEB, which went ashore at Detour shoal, will be another big job that will require several weeks.

From the East and South

THE COLE, a torpedo boat destroyer, was recently launched by the William Cramp & Sons Ship & Engine Building Co., Philadelphia. This vessel is the twentieth torpedo boat destroyer to be launched from the Cramp yards during the past year. Mrs. Edward B. Cole, widow of Maj. Edward B. Cole of the United States marines, who was killed at Chateau Thierry, acted as sponsor.

* * *

Because Boston and New England generally have plenty of coal, a fleet of about 20 steamers engaged in the fuel trade have been turned over to charterers and a number of the ships may load oversea. The fleet included several lake-built craft of about 3000 tons deadweight capacity and these smaller vessels may be utilized in moving sugar from the West Indies to the United States.

* * *

Steamer HERMAN F. WINTER, for years in the Metropolitan line service between Boston and New York, has been chartered by the United Fruit Co. to bring fruit from Bocas del Toro to Mobile, Ala.

* * *

Stevedore M. F. Donovan made quick time turning over the steamship WEST POINT at Boston recently when 6000 tons of merchandise for Brest, France, was placed aboard in 39 hours from time of arrival. Other transatlantic freighters have been given relatively quick dispatch since a strike of freight handlers tied up the port the latter part of last year.

* * *

A freight steamship, the MYSTIC, built at Chester, Pa., for Boston interests, will be commanded by Capt. C. F. Smith, formerly on steamers of the Merchants & Miners Transportation Co. The MYSTIC is 400 feet long and of 8500 tons deadweight capacity. A sister ship, the IPSWICH, will be launched soon at Chester.

* * *

The Port Clyde Cold Storage & Fisheries Co., Port Clyde, Me., has purchased for $275 the 2-mast schooner GATHERER, which put in at that port after been roughly used by gales.

* * *

The White Star line's Boston office announces that the CANOPIC and CRETIC are to be returned to the Mediterranean service, having been released by the British government. The first sailing from Boston was early in February.

* * *

A former Boston collier, the 6-masted schooner ELEANOR A. PERCY, has arrived

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at Buenos Aires from New York but under the Norwegian flag and as the DUSIE. Another schooner, the 6-masted RUTH E. MERRILL, is transporting coal from the States to Argentina.

* * *

Capt. R. C. Rawding, formerly in the schooner STANLEY SEAMANS, will command the new Boston 4-mast schooner IDA S. DOW, recently launched at Thomaston, Me. The vessel has been chartered to load barrel oil at New York for France.

* * *

Schooner FRED B. BALANO, recently wrecked near Jonesport, Me., while bound from Boston for Windsor, Nova Scotia, brought $25 for hull and $800 for sails and gear. The BALANO was one of the smallest 3-masters afloat, registering 215 net tons.

* * *

Steam trawler ALBATROSS, built at Portland, Me., for the East Coast Fisheries Co., has been placed in commission. Equipment is modern and includes a wireless outfit for use in keeping in touch with the market.

* * *

A cargo of telephone wire and steel left Boston for Melbourne, Australia, recently in the 3-mast schooner SPEEDWAY, Captain Fitzgerald. On account of high wages demanded by cooks, the vessel was delayed a week till a man was signed on at $120 per month with transportation home paid and $4 per day while returning.

* * *

Boston's $20,000,000 war embarkation plant was ready for business New Year's Day, the first vessel to go alongside being the Norwegian bark SKANSEN I. loaded with wool and ore from New Zealand.

* * *

All restrictions applying to navigation of Boston harbor were removed shortly after Christmas when the submarine net across the Broad Sound channel mine fields at the Narrows entrance were withdrawn. Boston light flashes again after having been dark since Sept. 30, 1918. A compressed air fog signal has been installed at Boston light.

* * *

Point Isabel, Tex., is trying hard to regain the prominent position it once held among the ports of the Gulf coast. The Brownsville & Tampico Marine Transfer Co. has opened freight service between Point Isabel and Tampico, Mexico, while the people of the Rio Grande valley are raising funds by private subscription to deepen the Brazos de Santiago channel, and open the way for traffic in behind Padre island as well. Engineers estimate that this improvement will cost approximately $125,000.

* * *

Government sale of five schooners, Jan. 4, at Pensacola, Fla., wound up the affairs of the Lutz Shipping Co., officers of which were caught in an alleged attempt to smuggle arms into Mexico from Pensacola. All were interned. The schooners, JOHN FRANCIS, SEQUIN, CRESCENT, MAUD H., DUDLEY and DILLA, are all under 400 tons, and all have been in the gulf trade.

* * *

Supplies for the Belgians will be taken from Boston in the British steamship AMICUS and Danish steamship JELLING. Relief for other countries is to be sent from Boston in a number of ships early this year.

* * *

The state harbor board of Alabama has adopted resolutions urging the state to take control of Mobile harbor and make necessary improvements there for the handling of foreign commerce. To do this, the state constitution will have to be amended.

* * *

Demand for sailing vessels and auxiliaries on the gulf is reflected in the chartering by the Bahamas Timber Co. of four large schooners in Mobile, Ala., in December for lumber service between Mobile and Cuban ports.

* * *

William J. Galbraith, superintendent in New Orleans for the Foundation Co., died at his home in Westmont, Montreal, Canada, recently. He directed construction of the Foundation Co.'s yard on the Industrial canal at New Orleans, and had gone home for a brief rest.

Along the Pacific Coast

HONOLULU has become a booster for the wood ship. The attitude of the islanders is based upon the fact that wood steamers have stimulated shipyard work at the plant of the Honolulu Drydock Co. and other shipbuilding and repairing concerns. During the past three months nearly $1,000,000 has been ordered spent in repairing leaks, boilers and rudders and correcting other difficulties encountered in the operation of the wooden steamers. As many as six vessels have been laid up at Honolulu simultaneously and the force of workmen in the island plants largely augmented.

* * *

Officials of the Standard Oil Co. have abandoned hope of finding the missing tanker GEORGE W. LOOMIS, which left San Francisco for Coos bay on Dec. 19 and has not been heard from since. Several New York marine insurance companies are interested in the vessel. Shipping men believe that the tanker was either wrecked off the northern California coast, or, suffering engine trouble, that she was blown far out of her course into a desolate part of the Pacific ocean. Families of the members of the crew have been paid the insurance due them from the company. The LOOMIS, first tanker to be built by the Standard Oil Co., was constructed by the Union Iron Works in San Francisco in 1896.

* * *

Deck officers on shipping board vessels out of Pacific ports are seeking a raise in pay to equal the amounts paid to officers in the same class sailing on the government steamers out of Atlantic ports. From $25 to $50 a month more is paid on the Atlantic coast. An anomalous condition prevails in regard to seamen. The men on the Atlantic receive $60 a month while $75 a month is paid in the Pacific division.

* * *

Importers of Oriental rice in San Francisco are perplexed and inconvenienced by the ruling of the war trade board prohibiting further importation of the grain. On Jan. 17 the trade board lifted all restrictions on the importation of Oriental rice into the United States and wired rice interests on the Pacific coast that licenses would be granted freely. On Jan. 22, however, all licenses which had been granted were revoked and the embargo was again made effective. Interdepartmental relations with the food administration is said to be responsible for this more recent action of the war trade board. It is admitted that a large percentage of imported rice is immediately exported to the West Indies and to Central and South America. The government is said to take the attitude that such shipments should be made direct in ocean carriers without burdening the rail lines of the United States.

* * *

Influenza is reported to have had a demoralizing effect on the copra crop of the South Pacific this season. Unless conditions change few, if any shipments are expected on the Pacific coast. So many of the natives are ill that the nuts lie scattered about the ground and are not touched. As a result of this condition, a number of vessels are expected to return from the South Seas in ballast on account of the lack of cargoes. Operators of small sailing vessels are seriously affected.

* * *

A watchman's delay in turning in a general alarm while he attempted vainly to extinguish a blaze originating among loose matches at the cigar stand, is said to be responsible for the loss of the $750,000 Southern Pacific ferry steamer SANTA CLARA in a spectacular fire on Jan. 25. One man was burned to death, another nearly drowned and a fireman seriously injured during the course of the fire.

* * *

The new service of the Toyo Kisen Kaisha between New Orleans and the Orient, via the Golden Gate, was established recently with the arrival of the PANAMA MARU at San Francisco for bunkers. The vessel was 21 days making the voyage from New Orleans to San Francisco. There is said to be plenty of freight for the Orient offering at New Orleans and it is thought likely that the service originally contemplated will be considerably augmented. The new service is in addition to that maintained by the company between Japanese ports and San Francisco, and Japanese and South American ports.

* * *

Because the bottom has fallen out of the price of cotton-seed oilcake on the Pacific coast, the schooner PHYLLIS, which arrived at San Francisco recently with 1180 tons of this product from Tamba de Mora, Peru, proceeded to the Atlantic coast, via the Panama canal to dispose of her cargo.

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Equipment Used Afloat and Ashore

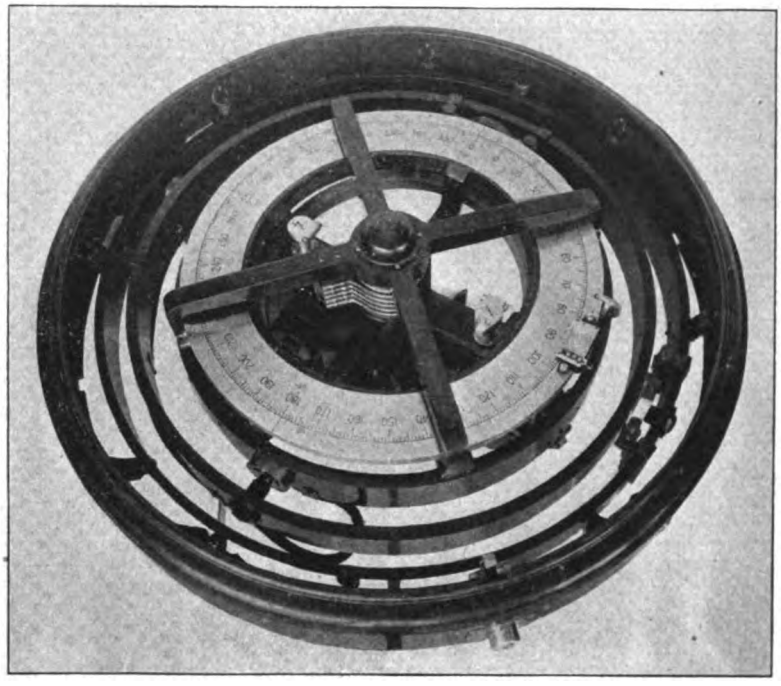
Gyroscopic Compass—Shipyard Cranes—Steel Ship Knees

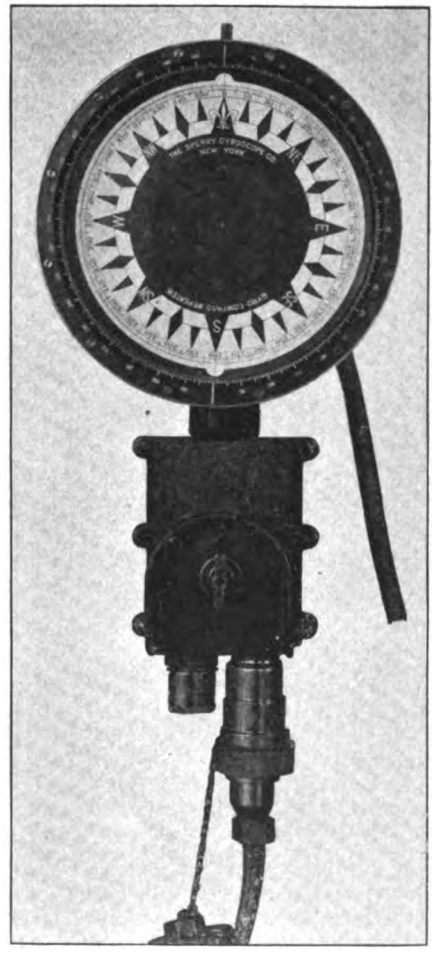
IF the magnetic compass would point to the true geographical north under all conditions, navigation would be a simple problem. In reality, however, the compass points to the magnetic pole which is situated some 300 miles south of the north pole. Further to complicate the problem, the magnetic pole changes its position from year to year. This variation or error is to be found on every chart.

The magnetic compass is also affected by ore deposits, when sailing on the Great Lakes for instance, magnetic mountains and other natural magnetic causes. Sometimes these errors are known and taken into account but often the navigator is ignorant of them with the result that many ships have piled up on a ledge or gone ashore.

On steel vessels, the compass is subjected to a further error called deviation. This error is caused by local magnetic effects of the ship and her cargo. This deviation varies with time, latitude, character of the cargo and with changes of temperature. A still further error, called heeling error, is caused by the change in the relative position of the ship's hull and cargo with reference to the compass. This is brought about when the ship rolls. To illustrate, if a vessel is steering due north and rolls to port, all the magnetic material of the ship to the eastward of the compass pulls the north pole of the compass toward it. When the ship rolls to starboard the reverse condition is brought about. Under these conditions, it is a difficult matter for the quartermaster to keep the vessel on her course.

Numerous compensating means have been provided for correcting deviation and heeling error; and on merchant vessels it is customary to have an expert compass adjuster come aboard periodically to correct all the deviation he can with means provided for this purpose. Then, by swinging the ship and taking observations on the sun or some distant object, he compiles a table of the residual deviation errors remaining in the compass. This table is used by the ship's navigator in laying out his course.





CARD OF THE MASTER GYROSCOPIC COMPASS IS SHOWN IN THE UPPER ILLUSTRATION—THE REPEATER IS SHOWN BELOW

With the object of providing a compass that would be free of such errors under all conditions, the Sperry Gyroscope Co., Brooklyn, N. Y., has developed a compass which makes use of a natural principle. The compass has been employed for some years on vessels of American, British and other foreign navies and gave service in the naval battles of the war.

In describing the magnetic compass, scientists teach that the earth is a large magnet and that all small magnets on the earth's surface have a tendency to place themselves in the same direction as the large magnet. This is why a magnetic compass points approximately north and south.

The gyroscopic compass works on a somewhat similar principle. Any small revolving wheel when placed on a large revolving wheel has a tendency to place its axis in the same direction as the axis of the large wheel. Thus, when a small revolving wheel is placed on the surface of the earth, and suspended so that it is free to follow its natural tendencies, it will place itself in such a position that its axis is pointing in the same direction as the axis of the earth, the small wheel rotating in the same direction as the earth.

The gyroscope is nothing more than a rotating wheel; a discovery of the French. The principle is not new, of course, as it was incorporated in a revolving toy more than 40 years ago. Its application in a compass, however, is comparatively new. Further to explain the action of the gyroscopic compass, imagine an observer at a point in space directly above the south pole of the earth. He would at once notice the earth, turning clockwise upon its axis which pointed directly toward him. Now, let it be assumed that he could also see a number of rotating wheels on the earth's surface. The axes of these wheels would be pointed toward him and the direction of rotation would be just the same as that of the earth.

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It is said that when this principle is incorporated in a compass an instrument is developed that will place itself in the true geographic north and south position. Such a compass is unaffected by anything except the rotation of the earth. Thus, errors due to the natural change in the earth's magnetic pole, changes due to ore deposits, etc., deviations caused by the heeling of the vessel, errors and deviations on steel vessels caused by local magnetic effects, are automatically avoided.

The principal parts of the gyroscopic compass equipment are the master compass, the repeater compasses, the motor generator and the switch panel. The master compass, shown in the upper illustration contains the mechanism that causes the compass to place itself in a true north and south position. The master compass is generally placed below decks in a position protected from the weather. Repeater compasses are used at the steering wheels, in the captain's cabin and in other positions where it is desirable to refer to the ship's course frequently. A repeater compass is shown in the lower illustration. The card is illuminated from behind by a light, its brightness being controlled by a switch. The repeater compasses bear the some relation to the master compass that repeater clocks bear to master clocks as installed in hotels and other public buildings.

The repeater compasses are operated by the master compass through a simple step-by-step mechanism wherein the transmitter turns the cards of the repeater compasses to cause them at all times to accord with the master compass card. The repeater follows the master with a time lag of only 1/200 of a second and will indicate a departure from the course of 1/6 of a degree; an accuracy not required for practical navigation.

A repeater compass may also be mounted in a pelorus stand for taking bearings. When a repeater is mounted in this manner, a true bearing can be obtained without reference to any other compass or tables. This is a decided aid when navigating from landfalls or lighthouses.

The motor generator utilizes part of the ship's supply of electrical current, turning this into alternating current for rotating the gyro wheels. Direct current at 20 volts is used for operating the repeater compasses. A standard storage battery is provided to give an emergency supply in case the ship's current fails for any reason. The battery will operate the entire equipment for a period of two hours.

The switch panel includes a small standard meter for measuring the voltage and current and several small switches for connecting and disconnecting the repeater compasses. It is said that the apparatus is easy to operate, and that it has given excellent results in actual use.

Traveling Cranes for Shipyard Use

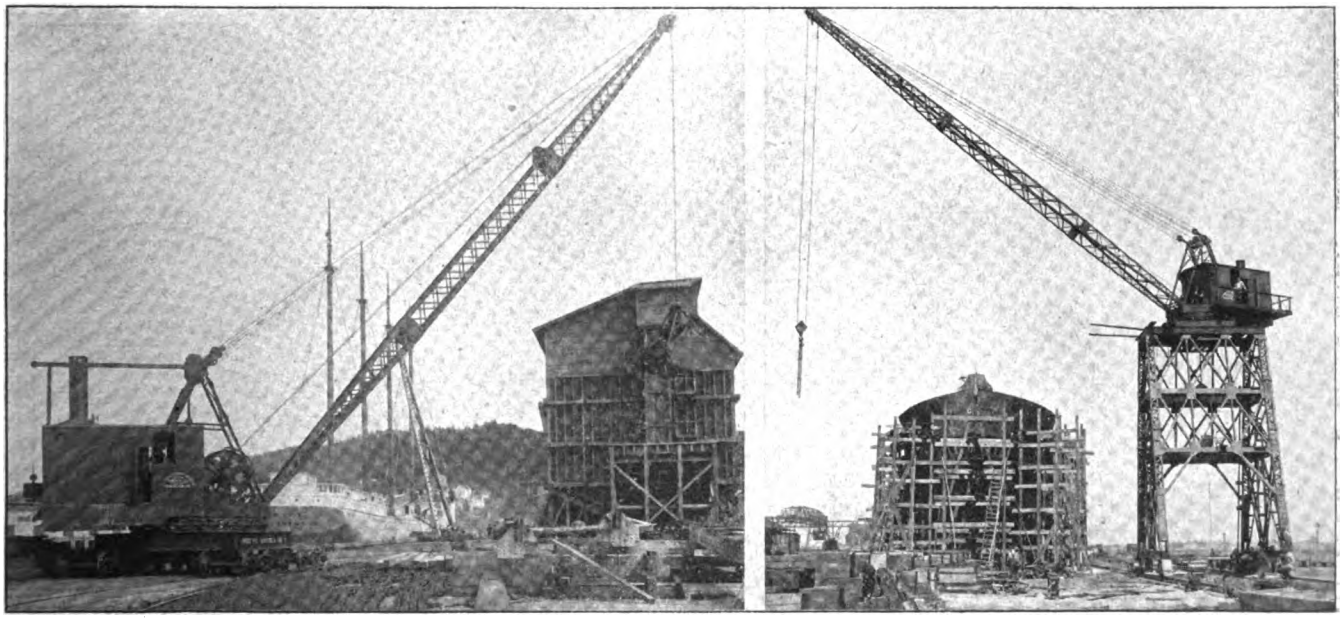
DEVELOPMENT of cranes for handling material in shipyards and ports has been rapid in recent months as war demands have increased the need for such equipment. Two types of cranes recently built for these uses by the Orton & Steinbrenner Co., Chicago, are shown in the accompanying illustrations.

The wide gage locomotive crane shown at the left was installed recently at the port of Astoria, Oreg., to facilitate loading and unloading cargo. It transfers coal or other bulk material from barge or ship hold to dock storage, from dock storage to hopper, handles lumber to and from decks of barges and performs other services. It is designed to travel, hoist, load and swing at the same time.

The boom is 85 feet long, with a 4-cubic yard clam-shell bucket. The cab is of steel for protection to the operator and machinery, allowing use in any sort of weather. The bucket may be operated at a maximum of 80 feet from the center of the crane. A load of 50 tons can be lifted at a radius of 17 feet and 7 tons at an 80-foot radius.

The traveling mechanism consists of four sets of standard-gage railroad freight car trucks connected by swivel joints to the corners of the car body. One axle of each truck is driven through a train of equalizing gears to allow travel around a curve of 70-foot radius. The trucks operate on tracks laid 16 feet, center to center.

At the right is shown a gantry locomotive crane in service at the Detroit yards of the Great Lakes Engineering Works, where steel ships are under con-



HOW MODERN EQUIPMENT EXPEDITES HANDLING OF HEAVY MATERIAL—AT THE LEFT, WIDE-GAGE LOCOMOTIVE CRANE ON THE DOCKS AT ASTORIA, OREG.—AT THE RIGHT, GANTRY LOCOMOTIVE CRANE AT A DETROIT SHIPYARD

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struction. The maximum radius is 86 feet and the minimum is 22 feet. The boom is 85 feet long from center to center of pins. At full radius 7000 pounds can be lifted. The hoisting speed, with full load, is 250 feet per minute. The traveling speed is 125 feet per minute and five revolutions can be made per minute.

The cranes are steam driven, oil being used for fuel. The motions of travel, hoisting, swinging and raising or lowering of booms are controlled from the operator's cab.

It is said that in actual use with coal for fuel the 10-hour consumption is 1200 pounds, 1000 gallons of water being used in the same time.

Steel Knees for Wooden Vessels

ONE problem in securing materials to which the war loaned emphasis was that of obtaining satisfactory material for ship knees. With the development of the shipbuilding industry in America during the nineteenth century, the American larch or tamarack, or hackmatack as it is more generally called, became recognized as the most valuable wood for ship knees as it is hard and durable with a light specific gravity. Hackmatack is not plentiful, however, its growth being confined to local sections in the northern part of North America. Again, but comparatively few knees can be obtained from one tree as they are cut from the point where the roots branch out from the trunk. In addition, it is difficult to obtain quantities of hackmatack knees in sizes over 6 inches. As the specifications for the 3500-ton Ferris-type ship, for example, call for 3, 6, 9, 10 and 16-inch knees, it is readily seen that a suitable substitute was urgently needed. Other woods have been tried but many of these did not give satisfactory results. To meet the urgent demand for a substitute for hackmatack knees, the Duplex Hanger Co., Cleveland, which specializes in wall plates, post caps, post bases, etc., as used in wooden building construction, developed fastenings for ship use which are slight modifications of the units used in buildings.

The columns of a building and the stanchions of a ship's hold are designed to serve the same purpose in a broad sense, because building columns support floor and roof rafters, while stanchions support the vessel's deck and hold beams. In comparing the two cases, however, a factor is present in ship construction that is absent in buildings. That is, building columns are invariably under compression only while a ship's stanchions are often under a slight tension when the vessel labors in a seaway. Fig. 5 shows how the Duplex company's products have been adapted for use in wooden ship construction. Each fastening consists of two side plates, *A*, and a distributing plate, *B*. The distributing plate prevents the stanchion from gradually forcing itself into the hold and deck beams for although the end wood of pine will easily stand a pressure of 900 pounds per square inch, the grain of the wood as it runs lengthwise begins to crush at a pressure of 250 pounds to the square inch. As the distributing plates are comparatively long, they distribute the strain of compression over a greater area, thus protecting the hold and deck beams from becoming gradually crushed. These plates take the place of the hardwood distributing blocks commonly used in places where end grain timbers support a load from a horizontal timber. The side plates directly over the keelson are bolted through the stanchions and fastened to the keelson by means of lag screws. The side plates over and under the hold beams are also bolted through the stanchions. Both units are firmly fastened together with bolts that pass through the hold beam. The plates directly under the deck beams are bolted through the stanchions and the deck beams. The plates at the side of the hold beams take the place of the straps usually placed at this

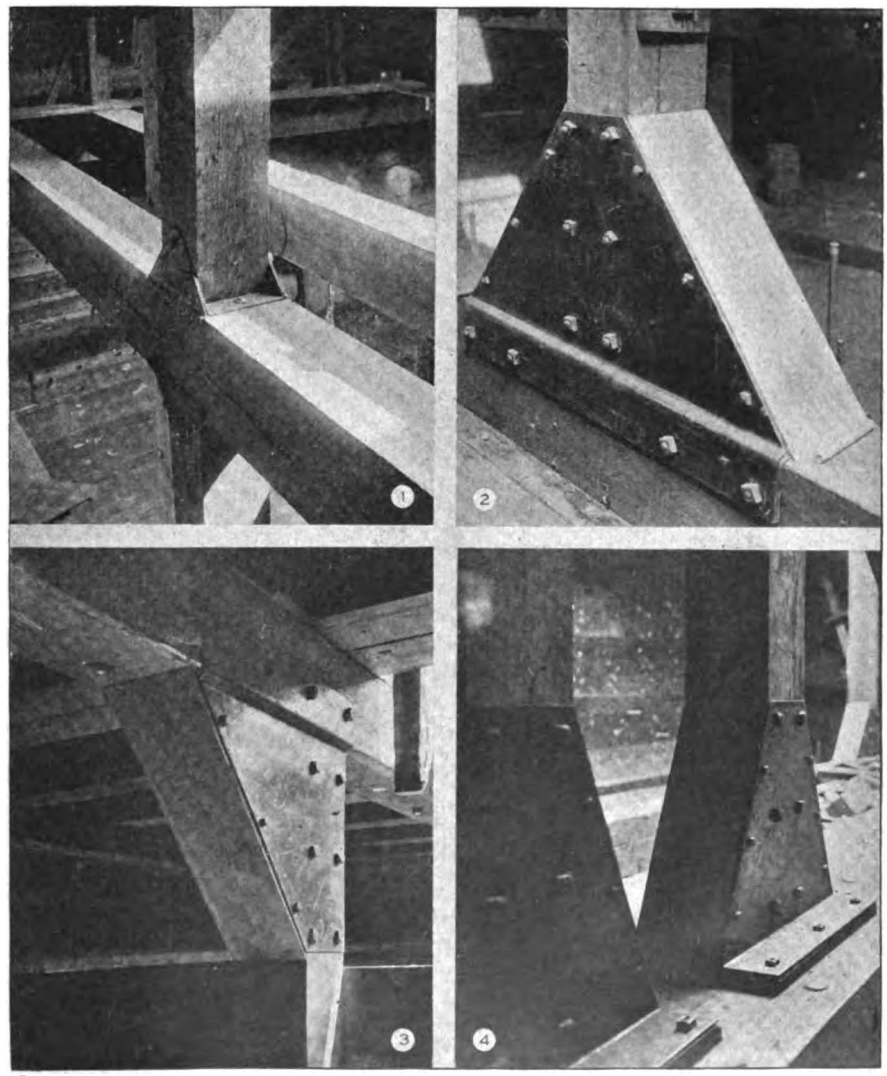

FIG. 1—CAP AND BASE USED TO FASTEN STANCHIONS TO HOLD BEAMS—FIG. 2—STANCHION BASE FOR A WING STANCHION—FIG. 3—WING STANCHION CAP NEAR A HATCHWAY—FIG. 4—CENTER STANCHION BASE

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point to help hold the timbers together when under tension while the side plates at the junction of the stanchions and deck beams eliminate the necessity of the strap commonly passed over the deck beams and fastened at the sides of the stanchions.

Further construction details are shown in Figs. 1 to 4. Fig. 1 shows how a cap and base ties a hold beam in place. The side plates of the cap and base are securely fastened to the stanchions by bolts running through them while the two units are tied together by two bolts running through the hold beam.

Fig. 2 is a base at the foot of a wing stanchion. In this case the side plates are offset to permit them to pass over the girder keelson which is somewhat wider than the stanchion. This illustration also shows how filler blocks are inserted between the side plates, each filler being bolted in place by three bolts which extend through the filler and both plates. The object of the filler blocks is to keep shifting cargo from being damaged as it might be through sharply striking the comparatively thin plates. Again, cargo nets coming in contact with the edges of these plates would soon become damaged.

Fig. 3 is a wing stanchion cap at the end of a cargo hatch. This, also, is provided with a filler block. The plates on wing stanchion caps near the cargo hatches do not extend beyond the stanchion on one side, the object being to leave as much unobstructed space as possible.

Fig. 4 is a center stanchion base. This construction differs slightly from that of the wing stanchion bases, as shown in Fig. 2, because the keelson is much wider than the stanchion; so much so that the offset side plates as used in a stanchion base on the wing stanchions would not be practicable. Instead, the side plates are bent at an angle of 90 degrees and securely bolted to the keelson.

These substitutes for wooden knees are made of open-hearth steel and are cut, punched and formed by methods commonly used in working structural and ship steel. Beside the units

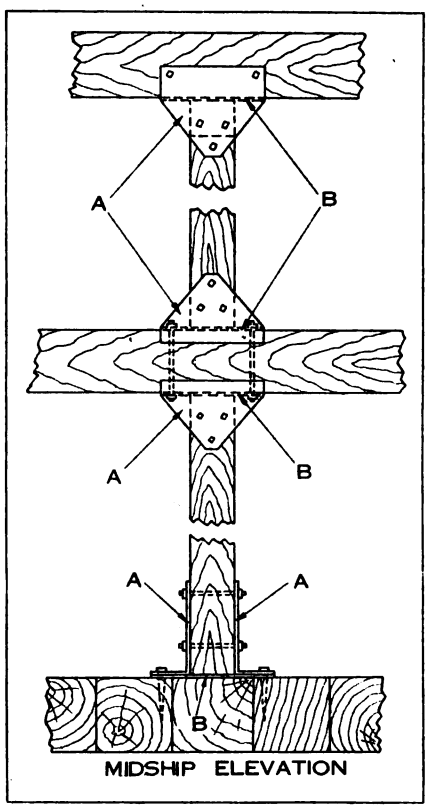

FIG. 5—WHERE STEEL CAPS AND BASES TAKE THE PLACE OF WOOD KNEES

shown, the Duplex company also makes lodging and hanging knees which are constructed on practically the same principle as the installations described.

The Duplex company entered the marine field when the need of a substitute for wood knees was keenly felt and immediately made up several samples which were tested and approved both by the American bureau of shipping and the Emergency Fleet corporation.

Fire Protection for Ships and Docks

The General Fire Extinguisher Co., New York, in a recent issue of its *Bulletin* discusses a new type of automatic sprinkler for ships and also fire protection on piers. The first article points out that ship owners and naval architects have maintained that any system which makes provision for the immediate discharge of water on the opening of a sprinkler head is inadvisable on shipboard because the danger of broken pipes, injured sprinklers or ruptured joints would more often cause accidental discharge of water than in buildings and with far graver results.

The company, however, has developed a sprinkler system for use on shipboard which automatically discharges water in case of fire but at the same time this result is not secured in case of injured sprinkler heads, broken piping, etc. It is stated that the general system follows shore practice regarding spacing, pipe sizes and general installation. The system is supplied from a steam fire pump working automatically. However, there is no water in the sprinkler system or no dry pipe valve as this is generally understood.

As a part of the sprinkler system, there is a thermostatic equipment which automatically controls admission of water into the sprinkler system proper. It is said that the system is practical as it overcomes the objections previously referred to in installing automatic sprinkler protection aboard ship.

That serious fires often occur along the waterfronts of all large cities is a well known fact. These fires may entail enormous losses and frequently develop huge proportions owing to the inability of city fire departments to cope with them. The second article points out that the sheds or wharves common to America form the most dangerous structures of their kind in existence. Built on wooden piling with wooden superstructures, they are comparable to nothing but horizontal flues through which flames rush with lightning-like rapidity.

It is stated that the relative scarcity of sprinkler systems in such property is due to the insurance conditions surrounding this class of risk. The pier owners do not themselves insure the valuable contents stored therein and this division of responsibility lessens the economic interest in adequately safeguarding the contents that business men generally have in protecting the contents of their factories.

Business News for the Marine Trade

The Bruce Drydock Co., Pensacola, Fla., plans the erection of a drydock with ship repair and construction facilities.

Arrangements are being made by the French-American Shipbuilding Co., Los Angeles, for the erection of a plant at San Pedro, Cal., for building steel concrete vessels.

The Mullen Construction Co., Pittsburgh, has taken over the drydock and shipbuilding yards at Prince Rupert, Ont., and will spend about $500,000 in improvements.

The San Diego Shipbuilding & Drydock Co., San Diego, Cal., contemplates the erection of a shipbuilding plant.

A small pipe bending shop will be erected by the Buffalo Drydock Co., Buffalo.

Plans for the construction of a $150,000 shipbuilding plant by the North Country Ship Building Corp., Ogdensburg, N. Y., have been indefinitely postponed.

Plans have been prepared for the Watson Drydock & Construction Co., Victoria, B. C., for the erection of a floating drydock and shipbuilding plant.

Work will be started soon on the construction of a shipbuilding plant for the Duffy Blinn Co., Saulnierville, N. S.

The Great Northern Railway Co., 607 Hastings

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street, Vancouver, B. C., is reported to be contemplating the erection of a drydock at Vancouver.

An addition to the plant of the Ohio Shipbuilding Co., Cleveland, is under consideration.

L. J. Weatherwax, Aberdeen, Wash., plans the erection of a plant for the building of small boats.

The Foundation Co., Victoria, B. C., has awarded a contract for marine boilers to the Vulcan Iron Works.

The Empire Drydock & Contracting Co., Prince Rupert, B. C., is contemplating building car ferry shops.

The Todd Dry Dock & Construction Corp., New York, has increased its capital stock to 70,000 shares of common stock and 5000 shares of preferred stock. The active working capital of the corporation is $850,000.

The boiler house and sawmill of the Russell Shipbuilding Co., East Deering, Me., recently were damaged by fire.

Plans have been completed for the erection of a torpedo storage building to cost about $250,000 at the naval torpedo station, Newport, R. I.

The Mobile Shipbuilding Co., Mobile, Ala., recently increased its capital from $1,000,000 to $5,000,000.

The Boston Marine Works, Boston, has been incorporated to build boilers and machinery with $50,000 capital by Thomas McGrath and Cornelius J. Donovan, both of East Boston, Mass., and Wallace J. Hatfield, Everett, Mass.

The bureau of yards and docks, navy department, Washington, is having plans drawn for a galvanizing plant, to cost about $110,000, to be erected at Norfolk, Va.

The bureau of yards and docks, navy department, Washington, has awarded a contract for the installation of two cranes in its machine shop at Portsmouth, N. H.

The government recently closed a contract with the Minneapolis Steel & Machinery Co. for the construction of six steel barges to cost $390,000. This is part of the allotment of 18 barges the government intends to operate between St. Louis and New Orleans to test the practicability of using the upper Mississippi as a transportation route.

The Seattle Chain Co., Seattle, recently was awarded a contract by the government for anchor chains to equip 40 steel vessels. The metal used in making these chains will weigh approximately 2,500,000 pounds. The officers of the company are: G. P. Goggin, president; Mr. Kjos, vice president and A. J. Kellogg, secretary and treasurer.

The Merchants Shipbuilding Corp., Harriman, Pa., has just completed a hotel for its shipyard workers. This structure covers nearly a full block and has a frontage of 439 feet with four side wings 162 feet long. The structure contains 479 rooms. The hotel will be under the management of Paul R. Boardman with Robert C. Hintz as assistant.

The machine shop owned by the Canada Steamship Lines, Ltd., Hamilton, Ont., located at the foot of James street, was damaged by fire with a loss of $15,000.

Plans have been prepared for the erection of shipyards for the Foundation Co., Ltd., Victoria, B. C. Bayley Hipkins is manager.

The Marine Engineering & Drydock Co., Providence, R. I., will build a 1-story, 60 x 305-foot shop and office to cost about $85,000.

The Crowninshield Shipbuilding Co., South Somerset, Mass., is to build a 3200-ton marine railway.

The Baltimore Dry Dock & Ship Building Co., Baltimore, Md., has opened an office in New York in the Equitable building, 120 Broadway.

A $20,000 shipbuilding plant is being contemplated by the Hudson Shipbuilding Corp., Tarrytown, New York.

Wendell P. Baker, Lester B. Donahue, Ira L. Anderson and George W. Wylie have formed a copartnership for the general practice of law. The firm name is Baker, Donahue, Anderson & Wylie and the offices are located at 27 William street, New York.

The harbor of Philadelphia now has an additional pier which is modern in all respects. It is located at the foot of McKean street on the Delaware river. Owing to war conditions, the pier had to be completed while it was in use by the United States quartermaster department. The pier will continue under government control for some time to come.

A ship repair plant will be erected at Perth Amboy, N. J., by the Perth Amboy Dry Dock. The plant will include a drydock, with a capacity of 12,000 tons, machine shop and other facilities.

Announcement was made recently that Director General Hines had authorized construction of 20 steel combination cargo barges to be placed in operation in the New York state barge canal next spring by the railroad administration. The boats will be 150 feet long, 22 feet wide, and will have a carrying capacity of 500 tons. The barges will be propelled by 400-horsepower motors.

City Engineer Cromwell, San Diego, Cal., is preparing plans for a mole, or filled pier, to be constructed 250 feet north of the present municipal pier. The government will furnish the material for filling the mole when the harbor in the vicinity of the pier is dredged. The structure will cost approximately $300,000.

The Anchor Co., Washburn, Wis., 623 Thirty-ninth avenue, plans the erection of a shipbuilding plant, to include a machine shop, 120 x 200 feet, blacksmith shop and punch shop, 160 x 300 feet and a forge and foundry, 55 x 270 feet.

The Boston Drydock & Shipbuilding Co., Boston, Thomas S. Baker, 721 Hotel Touraine, is taking bids for the erection of a ship repair plant, estimated to cost $6,000,000.

A new ocean pier is to be constructed at Vancouver, B. C., by the Canadian Pacific railroad.

The National Shipbuilding Co., Goderich, Ont., is in the market for new machinery.

William Cramp & Sons Ship & Engine Building Co., Philadelphia, is building a 1-story, 20 x 85-foot machine shop.

Several improvements are in progress at the Bay Point Shipyard, San Francisco. A new spur track will be installed in addition to the two miles of track already in use. Space is being prepared for a new 100 x 100-foot warehouse. Other improvements include an addition to the employes' restaurant and housing quarters. The yard is building 10 vessels for the government.

The Chester Shipbuilding Corp., Chester, Pa., has plans for a plant addition, 37 x 120 feet.

The Sun Shipbuilding Co., Chester, Pa., plans to erect a plant addition, one story, 45 x 80 feet.

Plans for the erection of an additional machine shop at the plant of the New York Shipbuilding Co., Camden, N. J., recently were filed with the city building inspector.

The Gaspe Shipbuilding & Trading Co., Gaspe, Que., recently was incorporated to build ships, etc., with $75,000 capital, by Alfred Lacouvee, H. J. Hyman and Thomas H. Jopling.

Improvements including the erection of a boiler house will be made at the plant of the Dominion Shipbuilding Co., Toronto, Ont. The total cost will be about $60,000.

Plans are being prepared by the Lyall Shipbuilding Co. and the Pacific Dredging Co., both of Vancouver, B. C., for the erection of a drydock estimated to cost $3,000,000.

Incorporation papers of the Piscataqua River Towing Co., Kittery, Me., recently were filed. The company is capitalized at $10,000 and was incorporated by H. A. Yeaton, E. Curtis Mathews Jr. and Aaron B. Cole. The company will build boats.

The American Pipe Bending Machine Co., Boston, is establishing pipe bending plants in several important manufacturing centers. The first plant is in operation at Lowell, Mass. Pipe bending appliances manufactured by the American company, will be used at all the plants. The company intends to specialize on pipe bending contracts which must be filled on short notice. Each plant will have the necessary facilities for turning out from 1000 to 3000 completed bends per day. The company is capitalized at $100,000, but will be reorganized with a capital of $1,000,000.

The Independent Pneumatic Tool Co., Chicago, has opened a branch office and service station in Cleveland, at 1103 Citizens building, where a complete line of pneumatic and electric tools, together with repair parts, are carried in stock. The office is in charge of Hayden F. White who has represented the company in Detroit, Chicago and Milwaukee districts for many years.

New Trade Publications

WELDING APPARATUS.—The Torchweld Equipment Co., Chicago, has issued an illustrated catalog describing its line of welding and cutting torches. Among the appliances described are those adapted for machine shop and shipyard welding. In steel shipbuilding, these torches are adapted to a variety of operations such as welding sheets and plates for various cutting operations. The torches are made in various sizes from 8 to 24 inches in length. The largest size weighs 35 ounces while the smallest weighs 3 ounces. The smaller sizes are particularly adapted for use by women.

BOILER CLEANERS.—A circular devoted to the boiler cleaning appliance manufactured by the Geyser Boiler Appliance Co., Detroit, has recently been issued by that company. It is pointed out that the use of the appliance makes unnecessary the periodical cooling down and washing of Scotch marine boilers, which practice sometimes results in injuries such as broken staybolts, fire cracks and leaky tubes and joints.

It is said that the device removes all mud sludge and other sediment from the boiler. In many cases, it is pointed out, scale formed previously to the installation of the apparatus falls from the heating surfaces, exposing the bare metal.

The circular includes an illustration showing the principal component parts of the device which are named for ready reference. Among the vessels on which the apparatus has been installed are the Essex, John P. Reiss, Harvey H. Brown, E. J. Earling, Calcite, M. A. Bradley, Columbia, St. Claire, Brittania, C. W. Cadwell, Annie Laurie, Ariel, Chas. Heidan, John McKerchey, William Livingstone, W. K. Bixby and the Harlow.

TOOL STEELS.—A booklet devoted to electric tool steels has recently been issued by the Carnegie Steel Co., Pittsburgh. The booklet contains much valuable information for the buyer and user of steels, written in clear nontechnical language. Several illustrations are included showing fractures of test pieces, as well as views of electric melting furnaces. Two color charts are also included. One gives heat colors with the corresponding temperatures in both Fahrenheit and centigrade while the other gives temper colors with the corresponding degrees of heat in both centigrade and Fahrenheit. Several useful tables are included giving weights of flat rolled steel, square, round, hexagon and octagon bars.

ARC WELDERS.—A folder devoted to arc welding apparatus has been issued by the Wilson Welder & Metals Co., Inc., New York. It is pointed out that the arc welding method was successfully employed in repairing the broken cylinder castings of interned German ships. The folder contains several illustrations showing welder installations and damaged and repaired castings.

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